C6985-4-F

OIL & GAS JOURNAL

Data Book

Annual Statistics, Surveys, Indicators, and Index

1986 Edition

Oil & Gas Journal DataBook

1986 Edition

OIL&GAS JOURNAL

Data Book

1986 Edition

PennWell Books
PennWell Publishing Company
Tulsa, Oklahoma USA

Copyright © 1986 by
PennWell Publishing Company
1421 South Sheridan Road/P. O. Box 1260
Tulsa, Oklahoma 74101

ISSN 8756-7164

All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transcribed in any form or by any means, electronic or mechanical, including photocopying and recording, without the prior written permission of the publisher.

Printed in the United States of America

CONTENTS

Foreword by Gene Kinney vii
OGJ 400 (September 9, 1985) 1
Crude Oil Assays 21
Worldwide Petrochemical Survey (1985 Worldwide Petrochemical Directory 63
Midyear Forecast and Review (July 29, 1985) 82
Worldwide Gas Processing Report (July 15, 1985) 86
Ethylene Report (September 2, 1985) 111
Sulfur Survey (September 16, 1985) 114
International Refining, Catalyst Compilation (October 14, 1985) 119
Pipeline Economics Report (November 25, 1985) 148
Worldwide Production and Refining Report (December 30, 1985) 156
Annual Refining Survey (March 18, 1985) 186

1985 Statistics

Morgan Pipeline Cost Index, Oil (November 4, 1985) 219
Morgan Pipeline Cost Index, Gas (November 25, 1985) 221
Nelson Cost Index (October 7, 1985) 224
Hughes Rig Count (month end) 227
Smith Rig Count (month end) 229
OGJ Production Report (month end) 230
API Refinery Report (month end) 231
API Crude and Products Stocks (month end) 235
API Imports of Crude and Products (month end) 238
OGJ 1985 Index 241

Foreword

The 1986 OGJ Databook traces a recovery that got sidetracked.

Following the upturn in demand, production, and drilling in 1984, industry looked forward to further gains in 1985. But, as it turned out, 1984 didn't mark the resumption of a new growth trend. It was merely a pause in the recession.

Petroleum markets sprang yet another surprise. When demand turned downward once more, production, profits and investment followed in lockstep.

Contrary to the assessment of a year ago, the impact of the two great price shocks of the '70s is not yet spent. It is still working its way through the world economy. Industry is restudying the data to try to get a better idea of the extent and duration of that impact.

With that knowledge, investors, operating companies, and their suppliers will be able to predict when their businesses will turn around. The statistical tables published weekly and monthly in *Oil and Gas Journal*, and compiled in this Databook, offer clues but no concrete answers. Indeed, after repeated surprises, learned economists have recently declared precise forecasting of one of the crucial elements in any recovery—price—to be beyond their competence. But they must try.

The problem is how to gauge the influence of surplus capacity. Pervading all levels of operations, it is still the dominant condition in industry. And continued weak markets are the inevitable result. So analysts must focus on the surplus, the gap between supply and demand, which is approximately 10 million barrels per day worldwide. As the figures show, 1985 did little to narrow that gap.

When can industry expect a return to stability?

There is a twofold answer to that question: (1) when OPEC limits production to market demand, with or without help from non-OPEC producers, who have steadily increased their market share since 1979, or (2) when market forces reduce supply and raise demand enough to restore balance.

Thus, depending on events, a return to stability could be as close as tomorrow or as distant as 1995. The analyst's job is to make a judgement between those two extremes.

What can industry expect from OPEC?

Since OPEC has all the surplus productive capacity, that's where analysis usually begins. How will OPEC manage the surplus?

For much of 1985, OPEC did in fact achieve a kind of stability, fleeting though it might have been. Even as members failed utterly to agree on official prices, and outsiders daily declared the cartel's demise, OPEC entered the peak winter demand season in reasonably good shape. Because of earlier production cutbacks, supply and demand were in temporary balance. Spot prices rose sharply.

But no one in the industry was impressed very much. Why? Because no one believed it would last. Rather than reflecting fundamental strength in the marketplace, firmness in spot prices merely meant two things: OPEC was for the moment limiting production to market demand, and buyers were living hand to mouth, taking care not to get caught with expensive inventory when the next price cut came.

In 1980, when demand began to collapse and the glut was born, there was widespread conviction that prices would not follow. It was an article of faith, contrary to all economic logic. OPEC supposedly was still in control. It had restricted production in order to raise prices and would do so again to prevent a decline. If demand fell further, Saudi Arabia would simply cut production in line with reduced demand. And the price would hold. Saudi Arabia eventually did just that. It cut back 75%, but that still didn't do the trick.

So, the Saudis decided they had had enough. They served notice they would no longer act as a one-nation Texas Railroad Commission. They would regain a portion of lost market share by abandoning official prices and accepting whatever the products market said Saudi crude was worth. Let those who had been overproducing worry about market stability for a while.

Will other OPEC members prove equal to the task? On the evidence to date, the answer would have to be no. Will help come from key non-OPEC producers, such as the U.K., Norway and Mexico? Not likely. They have shown no inclination to share the burden of surplus.

If the prospects for production discipline are dim, when will market forces—in particular, increased consumption—bring stability?

Industry isn't about to be bailed out by any resurgence in demand. Throughout the industrial world, demand turned downward again last year. The outlook is for no growth, perhaps a slight decline, in 1986 and for only modest growth averaging 1.5% annually over the next several years.

Even after a 20% decline from their peak, prices are still high enough to make conservation a major force. Capital investments to save energy still show very good returns. By the year 2000, refiners expect to reduce energy consumption per barrel of oil processed to just half the amount required in 1972. Other large consumers are making similar progress. So anyone hoping for a return to old consumption habits as a result of recent price declines is living in a fool's paradise.

In the U.S., where demand for motor gasoline has made some recovery, the gain has been small although the vehicle population continues to rise. The reason is that, for motorists, conservation is not a matter of choice; it is the law of the land. As motorists express a growing preference for larger cars, automobile manufacturers must reduce the size of those cars in order to meed federal mileage standards. Every new car, building, appliance, process, and piece of machinery is more energy efficient than the unit it replaces.

Outside the U.S., the incentive to conserve continues undiminished. Because of current prices and the specter of possible future increases, consumers are relentless in their substitution of other fuels for oil. National policies in Europe and Japan favor use of anything but oil. Where oil must be used, OPEC is the source of last resort. These policies place a strict limit on future growth in demand. They are not likely to change.

If demand will not come to the rescue, what about supply?

Supply is price elastic, too, even as demand, and reserves trends are still showing the effects of higher prices. In non-Communist countries in 1984, industry was able to replace 14 billion barrels of production and add 30 billion barrels to proved reserves. Almost all of that increase—28 billion barrels—came in the Middle East, location of already nearly two-thirds of Free World reserves.

Outside the Middle East, and outside OPEC, industry is not replacing production. All the leading indicators point downward. Exploration investment is off sharply, and trends in taxation, access to markets, geophysical activity, leasing, well permit applications, and active rigs all presage reduced exploration and discoveries in the future. Reduced returns and, even more important, lowered expectations for future returns are continuing the flight of capital from the industry.

In most countries petroleum is still recognized as a resource of immense economic and strategic value. Its discovery and development is still encouraged. Unhappily, that is not now the case in the United States.

American operators and investors are not only being discouraged by the market, where they must take their chances. They are being discouraged by threats of higher taxes, depressing drilling below levels dictated by economics alone, and by drilling bans in offshore regions holding some of the best untested prospects.

With drilling running at only half the 1981 peak, a production decline and sharp increase in imports seems inevitable. This will steadily narrow the supply-demand gap in the '80s.

The statistics in this Databook reflect an industry in the throes of restructuring. In today's weak petroleum markets, shares of public companies are trading at heavy discounts. You can prospect for oil more cheaply on Wall Street than you can in Oklahoma, Texas or Alaska, unless you beat the odds. So that's where oil companies are putting much of their cash: in their own securities and the securities of others. During 1985 stock repurchases and commitments by three companies alone were equal to half the U.S. industry's total budget for drilling.

Instead of investing for supply and profits tomorrow, oil companies are returning larger portions of their cash flow to stockholders today. This is the main feature of restructuring, which is the central industry strategy for dealing with surplus capacity and preventing a hostile takeover.

The companies that survive have reduced cash flow and often a towering debt, serviced by cutting investment. That means an exploration program that is both smaller and more conservative. No more rolling the dice for the big score. When you're leveraged to the hilt, there's little margin for short-term failure in the hope of huge long-term success. Let those risks be taken by smaller public and private companies if they can find the capital. In the current environment, that is a big "if."

This, then, is the outlook for a restructured petroleum industry: one of temporarily declining investment until consumers, Washington, Wall Street, and Riyadh send a different signal.

The data series that follow are offered in the hope they will provide clues as to when that signal might come.

Gene T. Kinney, Editor
Oil & Gas Journal

OGJ 400

The top 20 in net income and in stockholder's equity

Rank	Company name	Net income ($000)
1	Exxon Corp	5,528,000
2	Amoco Corp	2,183,000
3	Shell Oil Co	1,772,000
4	Chevron Corp	1,534,000
5	Standard Oil Co (Ohio)	1,488,000
6	Mobil Corp	1,268,000
7	Phillips Petroleum Co	810,000
8	Marathon Oil Corp	708,000
9	Unocal Corp	700,400
10	Tenneco Inc	631,000
11	Occidental Petroleum Corp	568,691
12	Atlantic Richfield Co	567,000
13	Sun Co	538,000
14	Conoco Corp	458,000
15	Texas Oil & Gas Corp	346,205
16	Texaco Inc	306,000
17	InterNorth Inc	296,816
18	Mesa Petroleum Co	270,184
19	Diamond Shamrock Corp	242,200
20	Sonat Inc	215,697

Rank	Company name	Stockholder's equity ($000)
1	Exxon Corp	28,851,000
2	Chevron Corp	14,763,000
3	Mobil Corp	13,624,000
4	Texaco Corp	13,107,000
5	Amoco Corp	12,524,000
6	Shell Oil Co	12,512,000
7	Atlantic Richfield Co	9,948,000
8	Standard Oil Co (Ohio)	8,390,000
9	Phillips Petroleum Co	6,624,000
10	Tenneco Inc	6,179,000
11	Unocal Corp	5,694,300
12	Sun Co	5,272,000
13	Occidental Petroleum Corp	2,903,569
14	Diamond Shamrock Corp	2,708,800
15	Amerada Hess Corp	2,573,218
16	InterNorth Inc	1,802,224
17	Union Texas Petroleum Co	1,769,533
18	Kerr-McGee Corp	1,740,000
19	Columbia Gas System Inc	1,684,225
20	Panhandle Eastern Corp	1,633,783

The top 20 in total assets and in total revenue

Rank	Company name	Total assets ($000)
1	Exxon Corp	63,278,000
2	Mobil Corp	41,851,000
3	Texaco Inc	37,744,000
4	Chevron Corp	36,358,000
5	Amoco Corp	25,734,000
6	Shell Oil Co	23,729,000
7	Atlantic Richfield Co	22,130,000
8	Tenneco Inc	18,205,000
9	Standard Oil Co (Ohio)	17,487,000
10	Phillips Petroleum Co	16,965,000
11	Sun Co	12,789,000
12	Occidental Petroleum Corp	12,273,084
13	Unocal Corp	10,202,800
14	Marathon Oil Corp	9,949,000
15	Conoco Corp	9,452,000
16	Amerada Hess Corp	6,352,832
17	InterNorth Inc	6,122,042
18	Texas Eastern Corp	5,757,357
19	Diamond Shamrock Corp	5,396,400
20	Panhandle Eastern Corp	5,369,112

Rank	Company name	Total revenue ($000)
1	Exxon Corp	97,288,000
2	Mobil Corp	60,474,000
3	Texaco Inc	47,935,000
4	Chevron Corp	29,207,000
5	Amoco Corp	29,008,000
6	Atlantic Richfield Corp	24,654,000
7	Conoco Co	22,300,000
8	Shell Oil Co	20,898,000
9	Occidental Petroleum Corp	16,237,563
10	Phillips Petroleum Corp	15,756,000
11	Sun Co	15,397,000
12	Tenneco Inc	14,960,000
13	Standard Oil Co (Ohio)	12,251,000
14	Unocal Corp	11,537,700
15	Marathon Oil Corp	10,185,000
16	Ashland Oil Inc	8,621,232
17	Amerada Hess Corp	8,353,752
18	InterNorth Inc	7,600,284
19	Coastal Corp	6,260,378
20	Texas Eastern Corp	6,194,239

Rank by total assets	Company	Total assets ($000)	Total revenue Rank	Total revenue ($000)	Net income Rank	Net income ($000)	Stockholders' equity Rank	Stockholders' equity ($000)	Capital & Expl. spending Rank	Capital & Expl. spending ($000)
1	**Exxon Corp.**	63,278,000	1	97,288,000	1	5,528,000	1	28,851,000	1	9,755,000
2	**Mobil Corp.**	41,851,000	2	60,474,000	6	1,268,000	3	13,624,000	4	3,806,000
3	**Texaco Inc.**	37,744,000	3	47,935,000	16	306,000	4	13,107,000	5	3,744,000
4	**Chevron Corp.**	36,358,000	4	29,207,000	4	1,534,000	2	14,763,000	7	2,902,000
5	**Amoco Corp.**[1]	25,734,000	5	29,008,000	2	2,183,000	5	12,524,000	2	4,630,000
6	**Shell Oil Co.**	23,729,000	8	20,898,000	3	1,772,000	6	12,512,000	3	3,927,000
7	**Atlantic Richfield Co.**	22,130,000	6	24,654,000	12	567,000	7	9,948,000	6	3,257,000
8	**Tenneco Inc.**	18,205,000	12	14,960,000	10	631,000	10	6,179,000	11	1,748,000
9	**Standard Oil Co. (Ohio)**	17,487,000	13	12,251,000	5	1,488,000	8	8,390,000	9	2,329,000
10	**Phillips Petroleum Co.**	16,965,000	10	15,756,000	7	810,000	9	6,624,000	13	1,387,000
11	**Sun Co.**	12,789,000	11	15,397,000	13	538,000	12	5,272,000	8	2,377,000
12	**Occidental Petroleum Corp.**	12,273,084	9	16,237,563	11	568,691	13	2,903,569	15	1,091,240
13	**Unocal Corp.**	10,202,800	14	11,537,700	9	700,400	11	5,694,300	10	1,944,800
14	**Marathon Oil Co.**[2]	[3]9,949,000	15	10,185,000	8	[4]708,000	—	NA	17	727,000
15	**Conoco Corp.**[5]	[3]9,452,000	7	22,300,000	14	[6]458,000	—	NA	12	1,387,000
16	**Amerada Hess Corp.**	6,352,832	17	8,353,752	26	170,455	15	2,573,218	14	1,112,161
17	**InterNorth Inc.**[7]	6,122,042	18	7,600,248	17	296,816	16	1,802,224	18	648,548
18	**Texas Eastern Corp.**	5,757,357	20	6,194,239	22	212,358	21	1,537,879	22	507,760
19	**Diamond Shamrock Corp.**	5,396,400	23	4,532,400	19	242,200	14	2,708,800	19	635,500
20	**Panhandle Eastern Corp.**	5,369,112	33	3,212,362	27	166,488	20	1,633,783	43	255,152
21	**Columbia Gas System Inc.**	5,200,536	22	4,645,175	28	152,892	19	1,684,225	41	272,009
22	**Williams Cos.**	4,534,000	32	3,388,700	29	149,500	25	1,284,000	42	262,000
23	**Pacific Lighting Corp.**	4,242,928	21	4,849,489	31	138,571	37	799,983	20	567,355
24	**Ashland Oil Inc.**[8]	4,036,941	16	8,621,232	397	(172,478)	35	845,899	38	303,651
25	**American Natural Resources Co.**[9]	4,000,700	31	3,492,700	24	196,100	27	1,195,100	29	404,600
26	**Mesa Petroleum Co.**	3,955,951	76	413,489	18	270,184	39	741,594	64	109,278
27	**Houston Natural Gas Corp.**[11]	3,945,459	58	[12]842,299	68	[12]36,883	31	1,007,443	28	[12]413,652
28	**Kerr-McGee Corp.**	3,771,000	29	3,537,000	49	65,000	18	1,740,000	26	434,000
29	**Transco Energy Co.**[13]	3,676,856	26	3,644,400	32	138,008	33	867,013	21	512,200
30	**Sonat Inc.**	3,639,574	35	2,631,979	20	215,697	23	1,434,911	37	312,408
31	**Consolidated Natural Gas Co.**	3,505,715	30	3,519,324	23	208,875	24	1,416,885	30	394,160
32	**MidCon Corp.**[8]	3,475,080	24	4,159,668	30	145,528	29	1,160,087	36	327,951
33	**Texas Oil & Gas Corp.**[14]	3,443,005	43	2,094,440	15	346,205	22	1,508,166	16	768,679
34	**Enserch Corp.**	3,362,734	28	3,544,717	35	118,829	28	1,173,824	34	372,003
35	**Coastal Corp.**[15]	3,295,733	19	6,260,378	38	101,716	47	577,886	52	153,542
36	**Pennzoil Co.**	3,242,837	37	2,348,676	33	130,509	26	1,212,174	33	372,200
37	**Champlin Petroleum Co.**[16]	[3]3,026,000	27	3,616,000	37	[6]110,000	—	NA	27	418,000
38	**Union Texas Petroleum**[17]	2,692,951	42	2,135,181	21	214,205	17	1,769,533	23	498,000
39	**Murphy Oil Corp.**	2,685,069	40	2,264,652	40	96,167	32	1,006,226	24	487,978
40	**United Energy Resources Inc.**	2,494,694	25	4,001,342	69	35,615	34	862,559	65	107,843
41	**Nicor Inc.**	2,384,573	36	2,419,430	398	(182,335)	43	597,604	50	175,198
42	**Valero Energy Corp.**	1,998,079	38	2,308,162	377	(16,144)	53	438,814	57	119,200
43	**Mitchell Energy & Dev. Corp.**[20]	1,981,396	57	930,708	47	72,778	48	518,770	44	253,924
44	**Freeport-McMoRan Inc.**	1,906,485	59	842,163	42	94,150	41	691,183	25	439,798
45	**Global Marine Inc.**	1,846,800	78	406,600	395	(91,200)	49	515,100	32	384,000
46	**Mapco Inc.**	1,792,668	45	2,031,505	34	125,633	38	760,956	61	114,247
47	**Meridian Oil Inc.**[21]	1,776,302	77	406,669	45	78,025	—	NA	47	221,412
48	**Montana Power Co.**	1,765,340	68	539,216	55	51,315	44	591,199	69	101,567
49	**Cabot Corp.**[8]	1,751,953	47	1,759,469	39	97,073	40	720,398	60	116,911
50	**Fina Oil & Chemical Co.**[22]	1,705,625	41	2,145,205	61	45,092	42	659,439	31	385,074
51	**Arkla Inc.**	1,667,660	52	1,180,705	50	63,752	52	465,469	61	116,836

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
1	590.0	1	1,622.0	1	6,474.0	1	29,785.0	1	285.0	1	977.0	3	2,715.0	1	17,884.0	1	1,279.0
6	217.0	2	1,164.0	6	2,440.0	2	21,922.0	8	113.0	4	607.0	8	1,041.0	4	8,092.0	7	752.0
2	374.0	3	1,053.0	2	3,249.0	5	9,590.0	4	210.0	2	944.0	5	1,887.0	7	6,539.0	3	1,037.0
8	174.0	7	519.0	8	2,073.0	8	6,448.0	7	115.0	7	443.0	7	1,328.0	9	4,583.0	8	743.0
3	310.0	4	1,019.0	5	2,618.0	3	15,202.0	6	149.0	3	694.0	6	1,737.0	3	9,684.0	5	899.0
7	200.0	5	596.0	7	2,436.0	6	7,703.0	5	195.0	5	590.0	4	2,321.0	5	7,455.0	2	1,160.0
4	261.0	6	566.0	3	2,941.0	4	15,087.0	2	240.0	6	524.0	2	2,746.0	2	14,288.0	9	598.0
16	50.00	9	435.0	16	369.0	11	3,545.0	14	36.00	8	435.0	15	252.0	11	3,539.0	11	372.0
5	232.0	35	56.90	4	2,903.0	7	6,972.1	3	232.0	32	56.90	1	2,903.0	6	6,972.1	6	792.5
10	114.0	8	473.0	10	1,110.0	10	6,114.0	10	62.00	11	286.0	11	659.0	10	3,925.0	13	341.0
13	82.00	11	319.0	13	896.0	13	3,211.0	9	71.00	10	287.0	9	745.0	12	2,728.0	30	123.0
11	113.0	13	258.0	12	1,011.0	15	2,607.0	15	30.00	12	249.0	14	263.0	14	2,385.0	12	360.3
14	71.00	10	409.0	14	853.0	9	6,194.0	12	59.00	9	325.0	10	663.0	8	4,824.0	15	302.0
12	94.73	14	216.2	11	1,081.4	12	3,242.9	11	59.75	16	144.2	12	575.6	17	1,758.2	14	314.0
9	131.0	12	307.0	9	1,390.0	14	2,868.0	13	44.00	13	248.0	13	366.0	15	2,182.0	17	279.5
15	61.00	15	178.0	15	699.0	19	1,879.0	16	26.00	22	98.00	16	228.0	25	880.0	44	79.0
31	8.111	34	57.14	25	86.34	24	1,092.9	53	2.583	38	48.94	43	20.18	23	940.1	61	55.1
29	9.237	32	60.94	18	179.1	33	712.2	116	0.539	64	16.24	110	5.143	72	135.8	78	35.4
18	26.84	21	119.5	20	144.1	28	933.2	32	5.369	21	103.1	30	37.71	26	799.6	18	241.4
38	4.906	24	83.17	47	22.71	21	1,402.4	36	4.463	23	81.68	47	19.08	19	1,354.9	26	140.2
61	2.531	25	81.61	66	14.46	29	906.1	58	2.133	25	79.81	70	10.21	29	755.1	55	61.0
90	1.100	99	8.900	129	3.800	115	79.40	81	1.100	91	8.900	123	3.800	104	79.40	83	32.0
45	3.741	89	11.23	38	37.71	101	95.73	40	3.519	87	9.805	32	34.08	111	70.71	27	140.0
32	7.900	92	10.80	37	39.70	73	161.6	86	0.900	83	10.80	108	5.200	65	161.6	34	103.0
74	1.466	54	27.48	53	19.29	54	306.0	66	1.466	52	27.48	46	[10]19.16	53	[10]256.0	56	59.5
39	4.818	23	103.9	40	31.53	22	1,370.0	34	4.737	20	103.2	35	30.07	20	1,343.3	51	67.4
122	[12]0.528	60	[12]20.57	98	7.895	48	383.9	117	[12]0.528	58	[12]20.57	87	7.895	42	383.9	66	43.6
24	15.40	30	68.10	26	85.10	40	520.3	25	7.100	30	65.30	25	45.30	38	457.2	53	64.0
43	4.186	31	67.25	60	16.11	42	512.1	37	4.186	29	67.26	54	14.65	43	377.0	50	69.1
51	3.284	50	35.80	97	7.952	71	172.1	44	3.284	48	35.80	86	7.952	63	172.1	87	30.5
56	2.714	19	127.0	62	15.85	25	1,013.0	49	2.714	17	127.0	52	15.85	21	1,013.0	10	455.1
58	2.704	39	48.97	46	23.88	52	349.7	51	2.704	37	48.98	39	23.88	46	349.7	37	100.0
36	5.744	16	177.2	39	32.85	20	1,639.8	30	5.744	14	177.2	33	32.85	18	1,639.8	4	947.0
27	10.86	29	76.26	28	67.38	31	776.3	23	10.83	27	76.27	21	64.59	28	776.3	35	102.3
55	2.724	26	80.10	54	18.53	27	985.1	48	2.724	24	80.11	48	18.53	22	985.1	84	31.8
25	13.00	17	163.0	22	126.0	26	995.0	21	13.00	15	152.0	18	125.0	24	920.0	29	129.0
19	25.10	20	121.7	17	179.1	18	1,896.4	17	25.10	18	121.7	17	179.1	16	1,896.4	25	144.0
17	31.00	18	159.0	19	155.0	17	2,449.0	26	7.000	31	65.00	23	48.00	32	589.0	33	116.0
20	20.80	33	60.50	21	136.5	34	695.7	31	5.500	34	53.20	31	35.30	41	394.0	69	40.8
73	1.483	62	20.01	81	9.587	68	207.3	71	1.343	60	19.97	82	8.482	62	202.0	74	38.0
85	1.200	65	17.80	102	7.500	77	149.9	80	1.100	67	14.90	92	7.200	81	125.0	75	37.8
26	[18]11.67	167	1.800	187	[19]1.400	145	35.30	22	[18]11.67	165	1.800	185	[19]1.400	139	35.30	148	13.9
23	16.70	36	56.00	23	114.7	37	606.4	19	16.70	33	56.00	19	114.7	31	606.4	32	117.3
59	2.700	46	38.50	65	14.50	36	607.4	52	2.700	44	36.80	60	12.80	39	456.5	130	16.0
155	0.285	156	2.287	150	2.700	134	48.42	151	0.285	153	2.287	144	2.700	128	48.42	165	10.8
40	4.703	85	12.00	61	15.94	326	1.000	38	4.138	79	12.00	57	13.37	326	1.000	—	NA
41	4.700	22	105.0	33	45.00	16	2,517.0	35	4.700	19	105.0	26	45.00	13	2,517.0	28	137.2
144	0.367	71	15.04	111	5.782	47	395.6	158	0.239	103	6.570	161	1.866	78	125.9	141	14.1
82	1.273	47	36.79	77	10.65	43	507.9	73	1.273	45	36.79	67	10.65	36	507.9	23	145.0
33	6.876	59	22.43	36	40.11	65	223.1	27	6.876	57	22.43	28	40.11	59	223.1	20	185.0
160	0.231	57	25.30	133	3.441	30	779.1	160	0.231	55	25.30	129	3.441	27	779.1	73	38.2

Rank by total assets	Company	Total assets ($000)	Total revenue Rank	Total revenue ($000)	Net income Rank	Net income ($000)	Stockholders' equity Rank	Stockholders' equity ($000)	Capital & Expl. spending Rank	Capital & Expl. spending ($000)
52	Louisiana Land & Exploration Co.	1,545,500	50	1,281,300	41	95,300	45	590,300	35	329,500
53	Ocean Drilling & Exploration Co.	1,478,442	61	784,677	44	82,538	36	844,301	48	207,304
54	Grace Natural Resources Group[23]	[3]1,452,000	66	568,000	63	[6]44,200	—	NA	85	66,000
55	Primark Corp.	1,384,155	44	2,042,393	57	49,504	61	381,030	89	61,227
56	Zapata Corp.[8]	1,358,655	75	421,300	73	30,752	50	483,008	45	253,583
57	Transco Exploration Partners Ltd.[24]	1,322,678	73	430,246	59	47,108	30	[25]1,084,508	40	294,454
58	**Tesoro Petroleum Corp.[8]**	1,106,031	34	3,118,845	93	17,314	54	438,381	64	110,932
59	**Reading & Bates Corp.**	1,071,133	79	391,449	80	25,318	51	477,448	75	86,318
60	**Santa Fe Energy Co.[26]**	[27]1,065,700	69	515,700	36	[6]113,400	—	NA	46	252,600
61	**Oneok Inc.[14]**	1,029,922	53	1,168,579	62	44,264	60	391,597	86	63,289
62	**Kaneb Services Inc.**	994,917	65	583,847	393	(45,501)	63	360,953	59	117,818
63	**Questar Corp.[28]**	991,055	63	686,809	48	71,187	59	394,953	63	111,723
64	Total Petroleum (North America) Ltd.	983,496	39	2,274,156	95	16,453	69	287,666	79	76,029
65	Petro-Lewis Corp.[29]	947,815	84	302,421	390	(33,429)	72	254,270	82	69,786
66	Brooklyn Union Gas Co.[8,30]	937,314	55	1,036,233	54	54,299	65	326,870	80	75,246
67	Pogo Producing Co.	922,026	88	247,942	88	20,242	85	160,968	54	133,112
68	National Fuel Gas Co.	906,622	54	1,104,175	56	49,911	68	295,155	87	62,287
69	Montana Dakota Utilities Co.	894,662	74	425,800	75	29,882	78	219,391	115	36,550
70	**Unimar Corp.[31]**	862,790	102	[32]161,147	115	[32]6,286	90	136,179	116	35,970
71	**Pioneer Corp.**	854,186	71	462,286	25	175,509	58	395,709	88	61,912
72	**Entex Inc.[29]**	840,127	51	1,221,652	51	60,515	71	274,848	103	44,093
73	**Hamilton Oil Corp.**	824,906	91	207,940	94	16,884	73	249,708	39	303,547
74	**Inexco Oil Co.**	811,149	97	183,882	379	(19,274)	74	239,017	68	103,512
75	**Apache Petroleum Corp.**	802,525	89	221,132	74	30,516	46	[25]589,169	51	172,075
76	Celeron Corp.[33]	790,480	64	661,400	43	[6]89,000	—	NA	55	131,917
77	Noble Affiliates	768,194	86	282,241	90	17,781	56	424,032	53	152,672
78	Equitable Resources Inc.[34]	761,867	67	552,002	46	74,217	66	320,289	74	88,755
79	Tidewater Inc.[35]	722,280	80	335,083	152	1,610	62	365,796	70	97,106
80	Southern Union Co.	721,951	62	771,628	392	(39,300)	87	151,703	91	58,898
81	Lear Petroleum Corp.	710,396	72	440,796	81	24,716	79	212,941	81	74,264
82	**CENEX (Farmers Un. Cent. Exch. Inc.)[8]**	697,086	49	1,487,794	121	5,424	67	302,503	122	32,228
83	**Tosco Corp.**	694,926	46	1,899,347	399	(210,697)	376	(163,343)	146	18,308
84	**Texas Gas Exploration Corp.[36]**	674,715	83	309,404	64	42,070	64	333,257	49	186,909
85	**Southland Royalty Co.**	642,904	81	329,860	72	33,643	82	168,197	56	120,545
86	**Helmerich & Payne Inc.[8]**	610,011	96	192,576	85	21,439	57	418,163	78	77,574
87	**Monsanto Oil Co.[37]**	582,608	90	212,103	83	23,685	—	NA	58	119,000
88	Quaker State Oil Refining Corp.	573,095	56	934,952	92	17,756	70	275,615	83	68,223
89	Crown Central Petroleum Corp.	528,682	48	1,612,236	190	504	80	188,776	134	24,276
90	Madison Resources Inc.	513,912	131	61,987	198	355	55	427,723	99	46,073
91	Forest Oil Corp.	505,320	104	154,711	98	14,169	99	93,620	72	89,599
92	Yankee Companies Inc.[29,38]	505,178	115	100,[illegible]2	113	6,843	145	28,928	203	5,596
93	KN Energy Inc.[39]	495,958	70	464,523	142	2,162	89	136,466	102	44,205
94	**Wicor Inc.**	489,634	60	823,842	78	25,741	86	156,492	124	31,465
95	**Apache Corp.**	489,256	111	115,608	86	21,276	75	227,524	105	42,421
96	**BHP Petroleum (Americas) Inc.[40]**	479,413	105	143,121	112	7,89[illegible]	88	137,171	112	39,059
97	**Crystal Oil Co.**	459,825	93	198,150	382	(21,357)	180	13,952	73	89,520
98	**Home Petroleum Corp.[41]**	433,353	119	93,836	341	[6](2,409)	—	NA	114	38,465
99	**Adobe Oil & Gas Corp.**	426,123	100	166,964	79	25,460	76	224,604	84	68,212
100	Fluor Oil & Gas Corp.[42]	391,000	116	99,400	82	23,900	—	NA	101	44,900
101	Buttes Gas & Oil Co.	389,516	110	119,591	387	(28,979)	175	16,335	175	10,178
102	First Mississippi Corp.[29]	380,855	87	273,420	96	15,965	84	166,957	108	41,034

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
22	17.10	27	79.00	24	99.10	44	496.3	20	13.20	28	71.40	22	57.50	47	332.9	46	74.3
28	10.30	42	43.90	29	60.30	49	367.4	43	3.300	41	43.90	45	19.20	50	315.5	95	26.3
42	4.355	52	31.79	34	42.67	59	258.2	45	3.114	50	30.76	40	21.93	55	246.9	99	25.0
180	0.163	131	4.021		NA	143	37.00	180	0.163	129	4.021		NA	137	37.00	—	NA
150	0.309	110	6.738	135	3.414	93	113.3	155	0.259	118	5.090	145	2.493	113	70.06	89	29.2
37	4.912	28	78.91	57	17.19	46	442.3	33	4.912	26	78.91	50	17.19	40	442.3	49	69.1
68	1.824	169	1.796	103	7.197	130	51.69	105	0.612	167	1.796	133	3.182	164	22.46	115	20.0
47	3.470	101	8.639	58	16.97	109	89.90	98	0.729	105	6.473	77	8.587	105	78.35	128	17.5
21	17.70	53	28.29	31	47.45	122	70.15	18	17.70	51	28.29	24	47.45	112	70.15	19	218.3
124	0.513	87	11.63	139	3.247	96	110.5	118	0.513	81	11.63	132	3.247	86	110.5	126	17.6
84	1.206	69	15.69	92	8.418	86	130.0	75	1.206	65	15.69	83	8.418	76	130.0	160	12.0
57	2.710	48	36.36	64	15.40	41	514.4	50	2.710	46	36.36	53	15.40	35	514.4	82	32.0
52	3.140	80	13.00	45	26.01	60	254.8	64	1.610	93	8.250	93	7.170	124	52.13	124	18.1
34	6.189	56	25.95	35	41.84	66	216.9	28	6.189	54	25.95	27	41.84	60	216.9	59	56.1
260	0.046	184	1.245	284	0.267	152	31.60	259	0.046	181	1.245	283	0.267	49	316.0	81	33.6
44	4.094	41	45.23	50	20.73	56	282.1	39	4.094	40	45.23	41	20.73	51	270.2	88	29.3
252	0.054	109	6.793	206	0.958	100	97.08	251	0.054	101	6.793	203	[10]0.958	90	[10]97.08	121	19.0
80	1.400	215	0.755	93	8.200	82	137.0	69	1.400	214	0.755	84	8.200	71	137.0	105	24.0
78	[32]1.418	44	[32]40.84	48	21.81	23	1,259.0	92	[32]0.786	95	[32]7.657	73	9.580	98	87.97	110	22.7
111	0.643	37	51.63	127	3.808	35	607.8	104	0.643	35	51.63	121	3.808	30	607.8	97	25.9
125	0.500	120	5.600	144	3.000	158	28.00	121	0.500	116	5.600	138	3.000	152	28.00	—	NA
54	2.907	104	7.130	30	52.29	32	717.0	143	0.319	114	5.766	126	3.651	130	44.98	209	5.9
63	2.386	58	23.06	67	13.60	51	351.6	55	2.386	56	23.06	56	13.60	45	351.6	52	64.0
64	2.249	38	51.36	75	11.08	58	262.0	56	2.249	36	51.36	65	[10]11.08	52	[10]262.0	129	16.8
185	0.147	82	12.84	52	20.12	74	160.0	185	0.147	76	12.84	44	20.12	66	160.0	38	97.2
50	3.342	55	27.23	41	31.30	57	265.6	47	3.050	53	26.43	37	28.31	54	250.0	54	61.1
120	0.550	49	36.02	130	3.727	45	459.9	114	0.550	47	36.02	124	3.727	37	459.9	21	179.2
71	1.726	133	3.702	99	7.807	160	27.17	138	0.348	138	3.092	156	2.019	161	24.25	114	20.7
149	0.310	128	4.511	156	2.233	102	95.48	146	0.310	124	4.511	149	2.233	91	95.48	94	26.5
141	0.386	63	19.16	174	1.650	84	134.1	135	0.386	61	19.16	172	1.650	74	134.1	113	21.0
66	2.035	194	1.030	72	12.39	233	6.479	59	2.035	193	1.030	61	12.39	232	6.479	136	15.0
140	0.386	278	0.207	73	12.00	260	3.574	134	0.386	278	0.207	62	12.00	260	3.574	—	NA
30	8.780	45	40.42	71	12.54	67	215.7	24	8.670	43	40.42	64	11.51	61	215.7	77	36.0
35	6.163	40	48.38	27	69.66	38	585.4	29	6.163	39	48.38	20	69.66	33	585.4	24	144.4
89	1.110	77	13.66	74	11.64	61	236.9	79	1.110	72	13.66	63	11.64	56	236.9	98	25.1
46	3.608	51	34.07	32	46.00	39	578.2	42	3.421	49	32.38	29	38.30	34	520.5	31	121.0
75	1.463	136	3.558	51	20.51	123	69.69	67	1.463	133	3.558	42	20.51	114	69.69	16	298.0
86	1.189	100	8.676	89	8.545	105	92.05	76	1.189	92	8.676	79	8.545	94	92.05	164	11.0
76	1.444	142	3.032	70	12.83	149	33.14	124	0.476	142	2.811	114	4.379	146	29.89	131	16.0
102	0.761	43	42.25	119	4.522	53	342.2	100	0.713	42	41.57	117	3.946	48	317.5	96	26.2
295	0.024	262	0.292	253	0.451	199	13.60	295	0.024	262	0.292	252	0.451	194	13.60	43	79.0
337	0.011	361	0.021	351	0.068	360	0.372	337	0.011	361	0.021	351	0.068	360	0.372	202	6.3
—	NA	—	NA	329	0.110	325	1.000	—	NA	—	NA	329	0.110	325	1.000	—	NA
107	0.721	61	20.18	128	3.807	75	151.8	99	0.721	59	20.18	122	[10]3.807	67	[10]151.8	175	10.0
53	3.087	68	16.42	44	26.96	62	233.2	46	3.087	63	16.42	38	26.96	57	233.2	60	55.2
48	3.425	64	18.88	59	16.14	85	131.1	41	3.425	62	18.88	51	16.14	75	131.1	42	79.8
77	1.422	76	14.00	79	9.722	90	125.0	68	1.422	71	14.00	71	9.722	80	125.0	90	29.0
65	2.176	94	10.62	42	30.57	83	135.0	57	2.176	85	10.62	34	30.57	73	135.0	45	76.3
49	3.400	90	10.90	55	18.30	80	141.9	91	0.800	113	5.800	91	7.400	115	69.20	177	10.0
134	0.428	115	6.232	136	3.363	69	190.3	141	0.341	126	4.413	141	2.838	101	84.59	286	1.7
135	0.427	122	5.068	157	2.202	142	37.25	130	0.427	119	5.068	150	2.202	136	37.26	67	42.4

Rank by total assets	Company	Total assets ($000)	Total revenue Rank	Total revenue ($000)	Net income Rank	Net income ($000)	Stockholders' equity Rank	Stockholders' equity ($000)	Capital & Expl. spending Rank	Capital & Expl. spending ($000)
103	Sabine Corp.	323,815	113	106,403	109	8,952	77	220,999	67	104,346
104	Damson Oil Corp.[8]	323,676	114	101,561	97	14,219	105	87,941	109	39,569
105	DeltaUS Corp.	303,810	108	129,665	385	(24,405)	111	79,279	119	33,625
106	Primary Fuels Inc.[43]	298,244	127	70,601	245	(51)	—	NA	71	92,927
107	Texas International Co.	296,151	107	140,273	383	(21,959)	374	(119,097)	77	79,122
108	Tom Brown Inc.[35]	262,645	147	46,335	375	(13,389)	95	112,814	125	30,588
109	Cenergy Corp.[35,44]	[3]261,399	128	66,392	106	[6]9,352	—	NA	107	41,263
110	**MCO Resources Inc.**	258,958	132	60,430	127	4,218	103	88,151	133	25,086
111	**Ensource Inc.**	237,681	140	51,038	137	3,116	109	81,288	111	39,240
112	**NUI Corp.**[8]	232,375	82	317,957	105	10,122	121	60,566	135	23,992
113	**Woods Petroleum Corp.**	231,526	118	94,889	89	18,281	91	132,530	113	38,518
114	**Kaiser Energy Inc.**[45]	229,183	157	36,019	118	[6]5,832	98	108,214	93	55,400
115	**Gulf Energy Development Corp.**[46]	221,582	98	178,390	128	4,112	107	85,692	140	22,800
116	Pelto Oil Co.[47]	216,093	123	76,203	70	[48]34,433	—	NA	94	54,600
117	Southwestern Energy Co.	212,196	117	96,958	87	20,832	110	80,803	104	43,620
118	Dyco Petroleum Corp.	210,608	141	50,977	108	[48]9,167	114	70,371	118	34,988
119	Depco Inc.[14,49]	208,200	112	109,700	53	54,800	—	NA	90	59,000
120	Universal Resources Corp.[50]	207,830	139	51,207	140	2,424	96	111,886	141	21,268
121	Kirby Exploration Co. Inc.	207,104	126	70,841	368	(7,184)	115	69,502	97	46,852
122	**Oxoco Inc.**	204,518	145	47,808	149	1,739	126	49,417	96	47,607
123	**Prairie Producing Co.**[51]	203,864	176	25,955	117	6,142	133	41,000	123	32,131
124	**Amarex Inc.**[52,53]	192,467	209	12,945	384	(22,989)	375	(155,607)	321	815
125	**Howell Corp.**	187,265	106	140,709	134	3,688	113	73,600	150	16,679
126	**Texas American Energy Corp.**	184,423	95	193,890	144	1,983	127	48,372	131	26,205
127	**Park-Ohio Industries Inc.**	182,812	94	195,314	119	5,739	102	90,217	159	13,821
128	Northern Michigan Exploration Co.[54]	181,111	120	90,107	103	10,569	93	125,638	92	58,013
129	INDREX Quarles Drilling[55]	176,281	161	34,766	366	(6,562)	83	167,401	128	27,831
130	Houston Oil Trust	175,915	143	49,402	60	46,421	81	175,915	—	NA
131	Templeton Energy Inc.	167,908	189	19,124	148	1,743	112	78,247	197	6,558
132	Felmont Oil Corp.[57]	166,482	121	81,408	101	11,352	92	130,235	139	22,825
133	Moore McCormack Energy[58]	166,300	166	32,400	102	11,000	—	NA	121	32,300
134	**American Quasar Petroleum Co.**	163,874	162	33,969	388	(29,018)	366	(2,635)	155	15,201
135	**Sage Energy Co.**[29]	163,757	124	75,379	99	12,392	101	90,696	95	49,997
136	**Bow Valley Petroleum Inc.**[59]	163,539	154	39,524	352	(3,324)	117	65,366	136	23,934
137	**Marion Corp.**[20,53]	163,006	174	26,125	381	(21,036)	214	7,958	214	4,642
138	**Wainoco Oil Corp.**	162,522	148	45,453	159	1,324	144	29,747	163	13,106
139	**Pyro Energy Corp.**	161,844	109	128,685	91	17,779	120	63,516	152	16,055
140	Tricentrol PLC[59]	153,707	186	20,317	138	2,908	—	NA	130	26,564
141	Michigan Energy Resources Co.	148,295	99	171,322	132	3,868	142	31,122	161	13,380
142	Callon Petroleum Co.	146,752	153	40,328	123	4,704	134	40,287	149	17,446
143	Triton Energy Corp.[60]	145,857	177	23,925	100	12,302	104	87,957	110	39,353
144	Kenai Corp.[20,61]	144,974	144	48,603	389	(30,886)	136	36,998	172	10,585
145	~~Worldwide~~ Pacific Corp.[62]	143,516	129	64,868	145	1,982	125	53,005	148	17,659
146	**Tipperary Corp.**[8]	134,748	138	53,861	391	(39,202)	131	41,635	132	25,650
147	**Allegheny & Western Energy Corp.**[29,63]	131,684	266	4,213	179	801	162	21,035	354	355
148	**May Petroleum Inc.**	126,722	165	32,435	378	(16,886)	116	67,663	164	13,081
149	**Consolidated Oil & Gas Inc.**[64]	123,235	163	33,210	124	4,694	199	10,213	153	15,521
150	**Conquest Exploration Co.**	123,163	170	28,378	131	3,884	108	85,068	76	82,456
151	**Entex Energy Development Ltd.**[65]	122,029	223	9,974	176	851	97	[25]110,508	207	5,198
152	**Alamco Inc.**	121,438	169	30,352	185	644	123	55,982	151	16,623
153	San Juan Basin Royalty Trust	117,959	155	38,775	67	38,345	94	[66]114,467	—	NA

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
67	1.900	72	15.00	69	12.90	89	125.2	60	1.900	66	15.00	59	12.90	79	125.2	36	101.1
101	0.778	108	6.795	112	5.626	92	114.3	93	0.778	100	6.795	103	5.626	84	114.3	123	18.5
128	0.463	114	6.290	134	3.428	120	73.97	125	0.463	108	6.290	130	3.428	109	73.97	80	34.5
98	0.839	79	13.20	115	5.304	94	112.0	95	0.752	74	13.20	107	5.304	85	112.0	65	44.0
60	2.619	70	15.24	63	15.44	88	128.2	54	2.503	75	13.18	55	14.19	100	85.91	40	89.1
87	1.175	141	3.053	68	13.29	126	65.25	77	1.175	139	3.053	58	13.29	118	65.25	109	23.0
112	0.611	107	6.879	125	3.869	125	66.49	106	0.611	99	6.879	119	3.869	116	66.49	122	18.7
103	0.759	84	12.33	116	5.179	91	120.2	94	0.759	78	12.33	109	[10]5.179	82	[10]120.2	104	24.2
113	0.604	98	8.986	107	6.427	87	128.7	107	0.604	90	8.986	99	6.427	77	128.7	102	24.8
276	0.034	216	0.749	277	0.325	227	7.146	275	0.034	215	0.749	276	0.325	224	7.146	108	23.0
79	1.410	66	17.04	83	9.329	70	183.7	70	1.349	68	14.71	88	7.807	83	116.0	71	39.3
157	0.251	116	6.127	186	1.407	78	143.4	156	0.251	109	6.127	184	1.407	68	143.4	48	71.0
229	0.079	168	1.796	263	0.388	176	17.93	228	0.079	166	1.796	262	0.388	171	17.93	179	10.0
108	0.708	73	14.62	106	6.507	107	90.97	101	0.708	69	14.62	98	6.507	96	90.97	132	15.5
168	0.208	74	14.42	188	1.387	63	230.1	168	0.208	70	14.42	186	1.387	58	230.1	58	58.6
175	0.180	93	10.70	214	0.847	121	73.10	174	0.180	84	10.70	211	0.847	110	73.10	200	6.4
62	2.400	75	14.10	49	20.80	64	227.4	63	1.800	88	9.400	68	10.50	117	65.30	76	37.5
99	0.828	102	7.713	114	5.404	114	79.48	89	0.828	94	7.713	106	5.404	103	79.48	68	40.8
151	0.302	132	3.808	142	3.068	164	26.38	147	0.302	130	3.808	136	[10]3.068	157	[10]26.38	354	0.2
126	0.490	124	4.768	145	2.955	146	35.15	122	0.490	120	4.768	139	2.955	140	35.15	169	10.6
136	0.407	138	3.515	95	8.004	127	64.10	131	0.407	135	3.515	85	8.004	119	64.10	137	14.7
208	0.103	159	2.225	159	2.140	128	57.61	206	0.103	156	2.225	152	2.140	122	57.61	302	1.3
97	0.856	130	4.114	78	10.45	113	80.66	88	0.849	131	3.764	69	10.22	120	63.97	186	8.5
121	0.547	143	2.993	110	5.975	165	25.63	115	0.547	140	2.993	102	5.975	158	25.63	64	46.3
170	0.203	126	4.654	131	3.590	99	105.1	170	0.203	121	4.654	127	3.590	89	105.1	72	39.0
70	1.800	97	9.000	94	8.100	129	57.10	62	1.800	89	9.000	94	7.100	123	57.10	47	71.0
184	0.148	191	1.124	225	0.720	162	26.69	184	0.148	189	1.124	222	0.720	155	26.69	85	31.0
105	0.736	88	11.39	138	[56]3.273	133	[56]49.19	97	0.736	82	11.39	131	[56]3.273	127	[56]49.19	197	6.9
173	0.193	137	3.556	146	2.918	72	165.9	172	0.193	134	3.556	140	2.918	64	165.9	252	2.8
104	0.739	83	12.45	120	4.450	104	92.37	96	0.739	77	12.45	113	4.450	93	92.37	79	34.8
117	0.581	144	2.978	88	8.558	132	50.17	112	0.581	141	2.978	78	8.558	126	50.17	167	10.7
127	0.480	129	4.457	165	1.890	97	108.4	123	0.480	125	4.457	160	1.890	87	108.4	223	4.5
81	1.336	118	5.971	84	9.087	139	38.17	72	1.336	111	5.971	75	9.087	134	38.17	41	88.9
94	0.934	135	3.647	87	8.701	140	38.03	84	0.934	132	3.647	76	8.701	135	38.03	151	13.6
159	0.234	188	1.199	147	2.819	180	16.91	159	0.234	186	1.199	142	2.819	177	16.91	263	2.3
123	0.519	81	12.95	137	3.278	55	293.5	145	0.310	128	4.065	190	1.271	132	39.43	257	2.5
163	0.227	155	2.346	203	1.049	179	17.05	161	0.227	151	2.346	200	1.049	176	17.05	13[illegible]	15.5
214	0.092	127	4.637	258	0.410	119	74.38	211	0.092	122	4.637	257	0.410	108	74.38	1[illegible]9	19.1
270	0.039	263	0.280	248	0.528	297	1.735	269	0.039	263	0.280	247	0.528	297	1.735	204	6.2
118	0.669	139	3.210	126	3.839	168	23.78	103	0.669	136	3.210	120	3.839	163	23.78	103	24.5
138	0.400	174	1.579	96	8.000	170	21.81	153	0.284	174	1.424	154	2.052	199	11.52	158	12.3
187	0.145	208	0.815	228	0.665	220	8.568	187	0.145	205	0.815	226	0.665	218	8.568	228	4.4
91	1.088	91	10.81	85	8.974	110	87.88	120	0.507	152	2.287	104	5.536	148	29.19	153	12.8
145	0.350	178	1.453	118	4.843	157	28.14	137	0.350	173	1.453	112	4.843	151	28.14	154	12.6
395	(s)	300	0.133	373	0.028	175	18.79	395	(s)	300	0.133	373	0.028	170	18.79	295	1.5
172	0.193	105	7.054	219	0.743	135	46.10	171	0.193	97	7.054	216	0.743	129	46.10	159	12.0
114	0.602	125	4.664	104	6.859	76	151.1	111	0.590	123	4.541	96	6.702	69	142.7	93	27.6
142	0.383	123	5.032	158	2.149	144	36.16	136	0.355	127	4.374	151	2.149	138	36.16	144	14.0
189	0.139	166	1.831	143	3.024	156	28.59	189	0.139	164	1.831	137	3.024	150	28.59	299	1.4
250	0.056	150	2.645	292	0.234	118	75.09	249	0.056	147	2.645	291	0.234	107	75.09	57	58.6
238	0.065	78	13.53	175	1.642	50	366.1	237	0.065	73	13.53	173	1.642	44	366.1	101	24.9

Rank by total assets	Company	Total assets ($000)	Total revenue		Net income		Stockholders' equity		Capital & Expl. spending	
			Rank	($000)	Rank	($000)	Rank	($000)	Rank	($000)
154	Pend Orielle Oil & Gas Co.[67]	113,127	130	62,028	77	26,605	—	NA	117	35,388
155	Wiser Oil Co.	112,295	135	56,476	111	8,095	100	91,998	129	27,583
156	Asamera Inc.[59]	112,077	85	286,654	372	[60](9,997)	—	NA	142	21,175
157	IMC Exploration Co.[29,69]	110,700	122	77,800	84	22,500	—	NA	184	8,026
158	Global Natural Resources Inc.	105,794	137	54,257	364	(5,968)	106	86,789	100	45,933
159	Unit Drilling & Exploration Co.	104,169	142	50,817	212	185	124	54,281	173	10,426
160	Argo Petroleum Corp.	102,727	171	26,821	294	(621)	161	21,467	167	11,156
161	Flag-Redfern Oil Co.	102,332	149	44,080	104	10,198	118	63,944	143	21,031
162	AMAX Petroleum Corp.[70]	102,233	125	74,248	71	34,347	—	NA	127	28,506
163	Seagull Energy Corp.	101,073	133	59,853	116	6,196	122	56,723	126	30,410
164	Marline Oil Corp.	97,116	225	9,696	386	(25,381)	173	16,684	106	42,073
165	Nicklos Oil & Gas Co.	96,778	168	30,434	380	(20,066)	132	41,160	212	4,775
166	Pauley Petroleum Inc.[14]	90,421	92	199,460	193	435	165	20,642	187	7,951
167	SPG Exploration Corp.[71]	83,251	159	35,186	343	(2,603)	—	NA	168	10,984
168	Galaxy Oil Co.	78,408	207	14,291	339	(2,265)	163	20,982	157	14,774
169	McCormick Oil & Gas Partnership[73]	77,511	160	35,003	110	8,556	176	[25]16,232	181	8,176
170	Magic Circle Energy Corp.	77,318	167	31,508	376	(13,894)	255	4,070	241	2,846
171	Maynard Oil Co.	71,754	164	33,145	334	(1,988)	141	31,336	145	18,620
172	OKC Limited Partnership	70,965	136	55,474	76	27,673	130	[25]43,482	169	10,795
173	Chieftain Development Co. Ltd.[59]	67,343	201	15,493	151	1,711	—	NA	144	20,147
174	Chapman Energy Inc.	67,289	206	14,452	141	2,374	151	26,271	171	10,695
175	Wilshire Oil Co. of Texas	66,277	191	17,151	133	3,751	168	20,085	185	8,012
176	Towner Petroleum Co.	65,504	182	22,110	396	(119,353)	373	(95,932)	233	3,262
177	LL&E Royalty Trust	63,934	152	42,474	65	41,766	119	[68]63,934	—	NA
178	Beard Oil Co.	62,465	151	42,845	189	553	186	12,934	158	13,826
179	Trinity Resources Ltd.	60,740	200	15,571	254	(113)	129	44,922	154	15,282
180	Ethyl Corp.[74]	[3]59,826	146	47,484	107	[75]9,322	—	NA	176	9,957
181	Federated Natural Resources Corp.	59,059	188	19,388	172	1,050	170	18,483	190	7,388
182	May Energy Partners Ltd.	58,181	213	12,252	143	2,092	140	[25]32,584	120	32,402
183	HCW Inc.[76,77]	57,662	195	16,566	114	6,711	139	33,269	202	5,756
184	Hadson Petroleum Corp.	56,638	194	16,739	157	1,360	150	26,873	137	23,901
185	Equity Oil Co.	56,345	184	21,594	125	4,400	135	38,230	170	10,789
186	GNC Energy Corp.[35]	55,768	156	38,698	355	(3,514)	183	13,784	274	1,612
187	Drillers Inc.[35]	55,180	228	9,360	122	4,739	154	25,382	303	1,139
188	Midland Southwest Corp.	54,464	181	23,023	373	(10,889)	174	16,537	227	3,655
189	Energy Ventures Inc.	53,637	190	17,460	165	1,127	147	27,662	340	540
190	McFarland Energy Inc.	53,169	192	17,026	129	3,994	138	33,601	147	17,776
191	Saxon Oil Co.	52,678	203	15,188	58	47,766	143	30,941	98	46,291
192	Snyder Oil Partners	52,299	193	16,944	136	3,571	128	47,728	138	23,329
193	Bracken Exploration Co.	47,624	199	15,714	349	(2,989)	171	17,733	174	10,397
194	Patrick Petroleum Co.	44,925	158	35,449	135	3,584	137	36,048	302	1,145
195	MacMillan Ring-Free Oil Co. Inc.	42,943	101	163,694	345	(2,623)	217	7,823	189	7,681
196	Fuel Resources Dev. Co. (FUELCO)[54,78]	41,016	219	10,392	161	1,223	164	20,676	243	2,740
197	Witco Chemical Corp.[74]	39,420	179	23,733	—	NA	—	NA	160	13,546
198	KenCope Energy Cos.[29]	38,976	180	23,034	214	153	148	27,347	200	6,011
199	Statex Petroleum Inc.[50]	38,970	197	16,168	328	(1,833)	149	27,186	166	12,200
200	Plains Resources Inc.	37,269	218	10,782	178	804	212	8,014	162	13,252
201	Partners Oil Co.	36,479	227	9,415	362	(5,471)	246	4,792	266	1,776
202	Presidio Oil Co.[29]	36,346	233	8,046	169	1,107	156	23,764	216	4,478
203	Rocky Mountain Natural Gas Co. Inc.	35,631	175	26,112	173	1,029	192	11,677	218	4,304
204	MSR Exploration Ltd.[60]	35,516	214	12,121	147	1,743	152	26,084	215	4,492

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
115	0.601	95	10.26	161	2.022	138	40.06	108	0.601	86	10.26	155	2.022	131	40.06	—	NA
88	1.115	113	6.300	91	8.496	112	82.46	78	1.115	107	6.300	81	8.496	102	82.46	39	93.4
217	0.090	286	0.180	306	0.167	352	0.524	213	0.090	286	0.180	306	0.167	352	0.524	336	0.5
118	0.570	86	11.68	140	3.155	106	91.20	113	0.570	80	11.68	134	3.155	95	91.20	118	19.3
132	0.430	96	9.389	152	2.582	95	111.6	133	0.386	102	6.594	170	1.676	160	24.84	125	17.7
194	0.129	187	1.225	240	0.571	217	9.365	194	0.129	185	1.225	238	0.571	214	9.365	198	6.9
100	0.822	173	1.646	56	17.99	137	42.76	90	0.822	179	1.326	49	17.99	144	31.74	170	10.6
95	0.917	117	6.013	109	6.225	151	32.36	85	0.917	110	6.013	101	6.225	143	32.36	86	30.6
119	0.550	67	16.75	123	4.015	81	139.6	119	0.511	115	5.682	125	3.696	133	38.73	217	5.0
376	0.003	209	0.808	348	0.074	166	25.15	376	0.003	207	0.808	348	0.074	159	25.15	176	10.0
179	0.163	185	1.243	190	1.361	197	13.67	179	0.163	182	1.243	187	1.361	192	13.67	163	11.0
207	0.107	190	1.124	238	0.576	214	9.635	205	0.107	188	1.124	236	0.576	210	9.635	307	1.2
92	1.080	206	0.834	76	10.73	191	14.33	82	1.080	203	0.834	66	10.73	187	14.33	183	9.1
130	0.453	112	6.455	105	[72]6.700	98	[72]105.7	127	0.453	106	6.455	97	[72]6.700	88	[72]105.7	143	14.0
153	0.290	186	1.236	80	9.597	103	92.94	149	0.290	183	1.236	72	9.597	92	92.94	62	52.3
178	0.176	103	7.637	207	0.932	111	86.17	177	0.176	96	7.637	205	0.932	99	86.17	328	0.7
154	0.289	146	2.790	90	8.496	116	77.95	150	0.289	144	2.790	80	8.496	106	77.95	352	0.3
137	0.402	134	3.700	151	2.683	117	76.51	152	0.284	176	1.387	171	1.674	208	10.25	255	2.5
83	1.247	119	5.873	121	4.352	150	32.82	74	1.247	112	5.873	115	4.352	142	32.82	276	2.0
283	0.030	239	0.470	257	0.411	241	5.869	283	0.030	239	0.470	256	0.411	240	5.869	216	5.2
176	0.178	171	1.688	172	1.694	188	15.22	175	0.178	169	1.688	168	1.694	184	15.22	106	23.4
143	0.377	151	2.567	149	2.789	148	33.79	140	0.342	160	1.950	174	1.630	173	17.56	157	12.4
165	0.215	140	3.161	215	0.830	169	22.41	165	0.215	137	3.161	212	0.830	165	22.41	184	8.9
96	0.894	121	5.329	108	6.256	172	20.93	87	0.894	117	5.329	100	6.256	167	20.93	294	1.5
129	0.457	147	2.778	179	1.572	200	13.03	126	0.457	145	2.778	178	1.572	195	13.03	100	25.0
152	0.298	164	1.876	170	1.738	209	10.77	148	0.298	162	1.876	166	1.738	205	10.77	63	48.6
171	0.201	148	2.756	198	1.124	136	43.28	178	0.173	161	1.927	204	0.956	172	17.76	168	10.7
147	0.337	161	2.071	199	1.109	216	9.389	142	0.337	158	2.071	196	1.109	213	9.389	251	2.8
204	0.110	149	2.672	204	0.997	163	26.56	201	0.110	146	2.672	201	0.997	156	26.56	258	2.4
343	0.010	277	0.216	346	0.076	341	0.718	343	0.010	277	0.216	346	0.076	341	0.718	240	3.2
182	0.153	387	0.003	182	1.501	392	0.021	182	0.153	387	0.003	221	0.721	392	0.021	192	7.6
106	0.735	202	0.896	86	8.780	124	68.68	110	0.593	219	0.706	95	6.721	121	63.31	145	14.0
356	0.007	285	0.183	303	0.171	242	5.571	356	0.007	285	0.183	302	0.171	241	5.571	—	—
297	0.023	213	0.768	307	0.165	230	6.762	297	0.023	212	0.768	307	0.165	228	6.762	—	—
256	0.052	249	0.361	251	0.508	236	6.255	255	0.052	248	0.361	250	0.508	235	6.255	353	0.3
133	0.429	152	2.494	154	2.276	190	14.36	129	0.429	148	2.494	147	2.276	186	14.36	—	—
116	0.599	192	1.048	82	9.354	212	10.40	109	0.599	190	1.048	74	9.354	207	10.40	150	13.8
139	0.397	207	0.831	122	4.181	206	10.92	132	0.397	204	0.831	116	4.181	202	10.92	111	22.7
148	0.317	160	2.075	176	1.629	174	19.04	144	0.317	157	2.075	175	1.629	169	19.04	236	3.5
259	0.046	145	2.799	271	0.344	167	23.79	258	0.046	143	2.799	270	0.344	162	23.79	162	11.3
177	0.177	182	1.277	300	0.183	307	1.396	176	0.177	180	1.277	299	0.183	307	1.396	259	2.4
201	0.114	—	—	223	0.735	—	—	199	0.114	—	—	219	0.733	—	—	—	NA
222	0.086	153	2.478	213	0.860	79	142.7	221	0.086	149	2.478	210	0.860	70	142.7	185	8.8
109	0.685	181	1.337	100	7.629	203	11.74	102	0.685	178	1.337	89	7.629	198	11.74	22	169.0
288	0.028	242	0.409	308	0.163	269	2.989	288	0.028	242	0.409	308	0.163	269	2.989	117	19.8
158	0.243	170	1.786	168	1.805	159	27.80	157	0.243	168	1.786	163	1.805	153	27.80	120	19.0
156	0.262	189	1.139	205	0.962	187	15.49	154	0.262	187	1.139	202	0.962	183	15.49	195	7.1
195	0.128	193	1.042	237	0.577	225	7.330	195	0.128	191	1.042	235	0.577	223	7.330	253	2.7
192	0.133	177	1.461	224	0.724	153	30.90	192	0.133	172	1.461	220	0.724	145	30.90	17[illegible]	10.6
72	[79]1.600	302	0.129	—	—	302	1.600	65	[79]1.600	302	0.129			302	1.600	—	—
188	0.139	282	0.191	178	1.612	239	5.975	188	0.139	282	0.191	177	1.612	238	5.975	112	22.0

Rank by total assets	Company	Total assets ($000)	Total revenue Rank	Total revenue ($000)	Net income Rank	Net income ($000)	Stockholders' equity Rank	Stockholders' equity ($000)	Capital & Expl. spending Rank	Capital & Expl. spending ($000)
205	Kimbark Oil & Gas Co.	35,470	237	7,667	197	364	169	18,714	186	7,970
206	Energy Management Corp.	34,740	210	12,937	374	(11,051)	371	(12,457)	211	4,794
207	Enertec Corp.	34,654	240	6,645	371	(9,942)	368	(8,405)	357	325
208	Hershey Oil Corp.	34,525	234	7,896	171	1,062	146	27,971	183	8,044
209	Jackson Exploration Inc.	34,407	178	23,909	194	426	236	5,454	209	4,863
210	Petrotech Inc.	33,906	222	10,156	174	897	230	5,930	165	12,448
211	**Royal Resources Corp.**[29]	32,131	204	14,685	130	3,948	155	24,665	177	9,901
212	**Petroleum Investments Ltd.**	32,117	224	9,806	363	(5,587)	158	[25]23,248	304	1,103
213	**Tucker Drilling Co. Inc.**[35]	31,252	173	26,324	223	90	159	22,587	198	6,365
214	**Minden Oil & Gas Inc.**[29]	30,575	245	6,057	353	(3,362)	179	14,090	206	5,200
215	**Petroleum Development Corp.**	30,036	202	15,220	303	(752)	208	8,579	294	1,244
216	**Baruch-Foster Corp.**	29,793	198	15,974	155	1,483	177	15,892	178	9,131
217	Bogert Oil Co.[8]	29,616	208	14,285	170	1,089	182	13,812	180	8,436
218	Adams Resources & Energy Inc.	29,463	103	155,058	126	4,359	369	(9,649)	252	2,199
219	Harken Oil & Gas Inc.	29,306	220	10,299	365	(6,337)	201	10,031	256	2,141
220	Euratex Corp.	29,099	229	8,587	350	(3,077)	166	20,535	199	6,036
221	Summit Energy Inc.[77]	28,832	231	8,082	154	1,526	157	23,396	223	3,703
222	Texas Energies Inc.[52]	28,511	196	16,330	204	312	189	12,657	195	6,635
223	**Shanley Oil Co.**	28,413	187	20,224	330	(1,873)	204	9,587	217	4,342
224	**Basic Earth Science Systems Inc.**[35]	27,992	262	4,449	277	(390)	172	17,390	208	4,965
225	**Equitable Petroleum Corp.**	27,024	236	7,712	139	2,424	228	6,704	213	4,692
226	**American National Petroleum Co.**	26,389	212	12,571	153	1,555	184	13,443	300	1,167
227	**High Plains Oil Corp.**	26,351	283	3,261	279	(401)	153	25,445	222	3,994
228	**Western Energy Development Co. Inc.**	26,039	281	3,397	310	(914)	234	5,581	277	1,536
229	Brock Exploration Corp.[35]	25,465	230	8,580	231	32	254	4,116	249	2,342
230	ConVest Energy Corp.	25,086	226	9,611	263	(195)	195	11,100	267	1,770
231	Wichita Industries Inc.	24,403	216	11,092	316	(1,037)	222	7,079	196	6,562
232	Transcontinental Energy Corp.[53]	24,295	172	26,357	394	(90,305)	372	(72,336)	221	4,031
233	Arapaho Petroleum Inc.	23,758	265	4,286	344	(2,609)	200	10,138	270	1,685
234	Strata Corp.	23,515	211	12,861	370	(8,647)	256	4,023	324	771
235	**Petrominerals Corp.**	23,176	183	21,852	175	882	191	12,007	204	5,359
236	**Valex Petroleum Inc.**	23,143	273	3,706	213	169	160	21,619	238	2,978
237	**Lomak Petroleum Inc.**	22,912	185	21,538	324	(1,298)	300	2,068	229	3,379
238	**Mid America Petroleum Inc.**[14]	22,468	243	6,333	356	(4,038)	268	3,403	225	3,669
239	**Premier Resources Ltd.**[8]	22,233	235	7,893	327	(1,741)	261	3,681	263	1,829
240	**Sabine Royalty Trust**	21,152	150	42,871	66	41,238	167	[85]20,491	—	—
241	Alexander Energy Corp.[35]	21,081	276	3,607	186	619	187	12,796	219	4,179
242	Cambridge Royalty Co.	20,326	263	4,399	347	(2,697)	196	10,698	226	3,664
243	Bellwether Exploration Co.	19,660	215	11,130	166	1,126	215	7,934	192	7,095
244	Monogram Oil & Gas Inc.[50]	19,366	261	4,504	167	1,122	209	8,523	224	3,682
245	Ratex Resources Inc.[8,81]	18,949	257	4,743	325	(1,626)	367	(8,301)	246	2,467
246	Southland Energy Corp.[50]	18,736	260	4,533	266	(224)	223	6,957	188	7,695
247	**Energy Oil Inc.**[29]	18,558	249	5,246	177	830	247	4,714	182	8,119
248	**American Frontier Exploration Inc.**[29]	18,420	271	3,926	318	(1,119)	342	775	194	6,636
249	**Sage Drilling Co. Inc.**[29]	17,907	217	10,863	312	(923)	188	12,773	258	2,038
250	**Argonaut Energy Corp.**[35]	17,895	277	3,531	295	(636)	194	11,127	235	3,193
251	**Resource Exploration Inc.**[8]	17,586	238	7,598	181	702	185	13,264	220	4,060
252	**Norris Oil Co.**	17,469	293	2,672	331	(1,916)	197	10,554	318	899
253	American Exploration Co.	16,983	264	4,342	300	(682)	178	14,980	193	6,730
254	Cibola Energy Corp.	16,541	270	3,974	306	(838)	202	10,024	285	1,444
255	HLH Petroleum Corp.[35]	16,477	256	4,774	342	(2,447)	328	1,194	284	1,457

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
183	0.152	212	0.770	193	1.275	211	10.42	183	0.152	211	0.770	189	1.275	206	10.42	140	14.2
190	0.137	154	2.396	239	0.571	177	17.30	190	0.137	150	2.396	237	0.571	174	17.30	315	1.0
216	0.091	198	0.973	222	0.734	195	13.99	218	0.086	200	0.878	224	0.691	201	11.02	330	0.7
202	0.113	176	1.503	189	1.373	141	37.85	202	0.109	208	0.805	193	1.185	259	3.595	187	8.2
215	0.091	244	0.395	208	0.930	250	4.421	212	0.091	244	0.395	206	0.930	249	4.421	219	4.7
191	0.134	221	0.675	197	1.161	194	13.99	191	0.134	221	0.675	195	1.161	190	13.99	265	2.2
146	0.345	183	1.269	173	1.685	226	7.147	139	0.345	184	1.226	169	1.683	226	6.996	173	10.1
231	0.074	162	2.035	268	0.362	184	15.72	230	0.074	159	2.035	267	0.362	180	15.72	285	1.7
206	0.107	227	0.616	267	0.362	253	4.115	204	0.107	227	0.616	266	0.362	252	4.115	161	11.8
220	0.087	199	0.926	132	3.522	222	7.921	216	0.087	197	0.926	128	3.522	220	7.921	224	4.4
299	0.022	253	0.349	232	0.636	171	21.21	299	0.022	252	0.349	230	0.636	166	21.21	233	3.9
131	0.432	172	1.653	124	3.885	192	14.20	128	0.432	170	1.653	118	3.885	188	14.20	156	12.5
205	0.108	158	2.249	235	0.597	181	16.77	203	0.108	155	2.249	233	0.597	178	16.77	142	14.0
225	0.082	211	0.771	261	0.404	251	4.370	224	0.082	210	0.771	260	0.404	250	4.370	282	1.8
228	0.079	197	0.988	266	0.365	245	5.059	227	0.079	196	0.988	265	0.365	244	5.059	—	—
193	0.131	180	1.350	220	0.741	208	10.78	193	0.131	177	1.350	217	0.741	204	10.78	215	5.2
197	0.122	175	1.561	164	1.944	201	12.42	196	0.122	171	1.561	159	1.944	196	12.42	268	2.2
210	0.101	223	0.646	226	0.693	215	9.479	208	0.101	222	0.646	223	0.693	212	9.479	91	28.9
244	0.060	233	0.511	250	0.512	235	6.377	243	0.060	233	0.511	249	0.512	234	6.377	235	3.6
209	0.101	267	0.260	183	1.498	243	5.359	207	0.101	267	0.260	181	1.498	242	5.359	152	13.3
181	0.158	228	0.613	141	3.116	155	28.73	181	0.158	228	0.613	135	3.116	149	28.73	139	14.3
164	0.216	165	1.831	192	1.320	207	10.82	164	0.216	163	1.831	188	1.320	203	10.82	267	2.2
242	0.061	268	0.253	243	0.556	290	2.028	241	0.061	268	0.253	242	0.556	290	2.028	301	1.4
247	0.058	320	0.088	148	2.802	255	4.014	246	0.058	320	0.088	143	2.802	254	4.014	272	2.1
196	0.126	204	0.837	191	1.321	224	7.764	220	0.085	206	0.814	241	0.559	231	6.637	317	1.0
169	0.204	201	0.899	221	0.738	228	7.138	169	0.204	199	0.899	218	0.738	225	7.138	291	1.6
174	0.182	275	0.217	194	1.224	282	2.463	173	0.182	275	0.217	191	1.224	282	2.463	188	8.1
162	0.227	200	0.910	181	1.532	248	4.631	163	0.227	198	0.910	180	1.532	247	4.631		NA
234	0.071	222	0.653	227	0.679	205	11.08	233	0.071	223	0.638	225	0.675	211	9.532	356	0.2
249	0.056	225	0.621	230	0.647	193	14.03	248	0.056	225	0.621	228	0.647	189	14.03	178	10.0
161	0.230	333	0.059	117	4.908	300	1.646	162	0.230	333	0.059	111	4.908	300	1.646	189	7.8
221	0.086	288	0.172	155	2.273	234	6.458	217	0.086	288	0.172	148	2.273	233	6.458	191	7.7
296	0.023	235	0.499	327	0.116	273	2.849	296	0.023	235	0.499	327	0.116	273	2.849	116	20.0
236	0.066	266	0.273	265	0.368	299	1.647	235	0.066	266	0.273	264	0.368	299	1.647	256	2.5
198	0.118	163	1.970	212	0.863	182	16.67	280	0.031	192	1.037	303	0.170	222	7.643	281	1.8
93	0.962	106	7.006	101	7.506	131	50.63	83	0.962	98	7.006	90	7.506	125	50.63	—	—
269	0.039	214	0.763	241	0.568	204	11.16	268	0.039	213	0.763	239	0.568	200	11.16	245	3.1
226	0.081	203	0.847	229	0.657	183	16.64	225	0.081	201	0.847	227	0.657	179	16.64	323	0.9
245	0.059	205	0.836	249	0.524	202	12.19	244	0.059	202	0.836	248	0.524	197	12.19	146	13.9
266	0.040	210	0.780	201	1.074	154	29.72	265	0.040	209	0.780	198	1.074	147	29.72	127	17.5
309	0.019	179	1.393	180	1.559	196	13.95	309	0.019	175	1.393	179	1.559	191	13.95	303	1.3
211	0.098	234	0.509	185	1.447	178	17.15	209	0.098	234	0.509	183	1.447	175	17.15	355	0.2
268	0.039	218	0.736	167	1.805	185	15.54	267	0.039	217	0.736	162	1.805	181	15.54	92	28.2
237	0.065	224	0.631	195	1.187	189	15.02	236	0.065	224	0.631	192	1.187	185	15.02	182	9.2
336	0.011	272	0.230	335	0.099	321	1.099	336	0.011	272	0.230	335	0.099	321	1.099	318	0.9
280	0.031	226	0.618	246	0.531	213	9.642	279	0.031	226	0.618	245	0.531	209	9.642	234	3.6
241	0.063	195	1.018	276	0.329	223	7.807	240	0.063	194	1.018	275	0.329	221	7.807	147	13.9
230	0.076	270	0.246	177	1.614	161	26.81	229	0.076	270	0.246	176	1.614	154	26.81	—	NA
233	0.071	261	0.299	216	0.811	274	2.808	232	0.071	261	0.299	213	0.811	274	2.808	205	6.1
243	0.060	248	0.379	245	0.531	291	1.991	242	0.060	247	0.379	244	0.531	291	1.991	241	3.2
292	0.025	299	0.135	324	0.123	278	2.632	292	0.025	299	0.135	324	0.123	278	2.632	249	2.9

Rank by total assets	Company	Total assets ($000)	Total revenue Rank	Total revenue ($000)	Net income Rank	Net income ($000)	Stockholders' equity Rank	Stockholders' equity ($000)	Capital & Expl. spending Rank	Capital & Expl. spending ($000)
256	General Hydrocarbons Inc.	15,494	288	2,911	248	(70)	233	5,801	242	2,780
257	Chaparral Resources Inc.[64]	15,374	352	801	265	(223)	207	8,684	308	1,088
258	Great Eastern Energy & Dev. Corp.	15,367	346	837	351	(3,159)	299	2,084	276	1,545
259	Excel Energy Corp.	14,673	258	4,577	338	(2,252)	213	7,972	210	4,810
260	Nugget Oil Corp.[52]	14,636	285	3,041	361	(5,136)	319	1,367	272	1,671
261	Pyramid Oil Co.	14,192	221	10,199	207	263	193	11,589	236	3,144
262	Seaxe Energy Corp.[82]	14,038	389	285	322	(1,213)	181	13,878	156	14,798
263	KRM Petroleum Corp.	13,928	272	3,924	272	(323)	198	10,384	251	2,228
264	Seahawk Oil International Inc.	13,854	278	3,464	208	257	219	7,593	232	3,269
265	Permian Basic Royalty Trust	13,841	134	57,331	52	56,776	206	[88]8,876	—	NA
266	Altex Oil Corp.[8]	13,748	250	5,241	333	(1,963)	190	12,121	271	1,684
267	Reichhold Energy Corp.[83]	12,886	255	4,820	146	1,822	225	6,872	237	3,112
268	Swift Energy Co.	12,639	300	2,267	188	583	250	4,624	273	1,653
269	Dietrich Resources Corp.[60]	12,238	252	4,993	293	(615)	224	6,950	205	5,355
270	Greenwood Resources Inc.	11,993	279	3,463	274	(369)	252	4,266	259	1,993
271	Vermillion Bay Land Co.[35]	11,967	246	5,863	158	1,335	205	9,586	240	2,923
272	Antares Oil Corp.	11,835	289	2,900	319	(1,129)	227	6,713	179	9,096
273	Geodyne Resources Inc.[84]	11,690	287	2,921	357	(4,070)	365	(2,211)	262	1,829
274	Golden Oil Co.[29]	11,472	251	5,069	203	334	239	5,348	201	5,965
275	Discovery Oil Ltd.	11,189	253	4,975	348	(2,898)	361	201	310	1,068
276	Striker Petroleum Corp.	11,172	259	4,557	150	1,720	210	8,325	228	3,627
277	Peninsula Resources Corp.	10,735	232	8,063	367	(6,925)	370	(12,211)	334	645
278	Noarko Resources Inc.[8]	10,667	284	3,167	360	(4,936)	242	5,025	307	1,088
279	Deca Energy Corp.[35]	10,353	355	737	290	(536)	203	9,754	275	1,584
280	GeoResources Inc.	10,301	254	4,962	184	652	231	5,895	315	979
281	Thor Energy Resources Inc.[20]	10,224	242	6,472	156	1,382	229	6,261	352	365
282	Burton/Hawks Inc.	10,192	290	2,885	354	(3,398)	216	7,847	254	2,163
283	Bluewater Oil & Gas Ltd.[52,85]	10,084	280	3,450	182	695	211	8,080	257	2,109
284	Pathfinder Petroleum Corp.[20]	9,891	314	1,746	180	730	265	3,513	388	64
285	Pangea Petroleum Co.	9,631	294	2,637	206	304	232	5,861	353	360
286	Newhall Resources	9,553	205	14,569	120	5,574	221	7,430	280	1,507
287	Fossil Oil & Gas Inc.[35]	9,238	313	1,807	369	(7,963)	347	694	247	2,461
288	Intercontinental Energy Corp.[8]	8,865	244	6,203	329	(1,838)	283	2,677	244	2,737
289	Oregon Natural Gas Dev. Corp.[86]	8,864	248	5,682	340	(2,310)	315	1,587	191	7,316
290	J M Resources Inc.[29]	8,603	296	2,494	317	(999)	320	1,353	370	188
291	Henry Energy Corp.[29]	8,580	241	6,574	218	140	240	5,266	250	2,257
292	Century Oil & Gas Corp.	8,505	292	2,796	307	(844)	307	1,730	234	3,206
293	Whiting Petroleum Corp.	8,240	312	1,818	202	339	218	7,709	325	764
294	So. Texas Drilling & Exploration Inc.	8,058	239	6,749	346	(2,696)	338	856	356	334
295	Gerber Energy International Inc.[87]	7,930	275	3,656	311	(919)	248	4,702	231	3,353
296	Jefferson-Williams Energy Corp.[64]	7,799	329	1,254	273	(364)	293	2,433	260	1,967
297	Nahama & Weagant Energy Co.[20]	7,785	282	3,273	285	(472)	258	3,787	269	1,729
298	Evergreen Resources Inc.[35]	7,700	358	644	299	(666)	220	7,498	264	1,798
299	Kee Exploration Inc.	7,644	326	1,310	286	(473)	245	4,844	286	1,436
300	Credo Petroleum Corp.[50]	7,467	342	882	209	203	226	6,787	344	481
301	Centennial Petroleum Inc.[35]	7,465	309	1,932	326	(1,660)	352	523	330	684
302	Eagle Exploration Co.[35]	7,331	295	2,606	358	(4,546)	358	311	339	552
303	Bayou Resources Inc.	7,326	286	2,978	200	342	276	3,009	248	2,393
304	Alta Energy Corp.[29]	7,185	303	2,215	217	145	278	2,919	309	1,087
305	Panhandle Royalty Co.[8]	6,949	267	4,177	168	1,119	251	4,348	328	703
306	Enex Resources Corp.	6,766	247	5,796	162	1,205	238	5,381	293	1,245

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
265	0.040	238	0.472	275	0.329	229	6.921	264	0.040	238	0.472	274	0.329	227	6.921	316	1.0
334	0.012	309	0.106	210	0.896	147	33.99	334	0.012	309	0.106	208	0.896	141	33.99	306	1.2
330	0.013	366	0.016	169	1.770	283	2.370	330	0.013	366	0.016	164	1.770	283	2.370	210	5.7
227	0.079	237	0.475	259	0.409	219	8.917	226	0.079	237	0.475	258	0.409	217	8.917	207	6.0
308	0.019	217	0.741	310	0.157	186	15.51	308	0.019	216	0.741	310	0.157	182	15.51	212	5.4
166	0.209	294	0.150	162	1.982	330	0.868	166	0.209	294	0.150	157	1.982	329	0.868	107	23.0
371	0.004	356	0.029	286	0.263	263	3.289	371	0.004	356	0.029	285	0.263	263	3.289	248	3.0
213	0.094	252	0.352	247	0.528	244	5.209	210	0.094	251	0.352	246	0.528	243	5.209	138	14.5
240	0.064	256	0.333	160	2.077	237	6.210	239	0.064	256	0.333	153	2.077	236	6.210	278	1.9
69	1.811	111	6.504	43	28.90	108	90.73	61	1.811	104	6.504	36	28.90	97	90.73	—	NA
254	0.053	276	0.216	256	0.431	336	0.783	253	0.053	276	0.216	255	0.431	336	0.783	226	4.4
390	0.001	219	0.726	384	0.011	247	4.708	390	0.001	218	0.726	384	0.011	246	4.708	135	15.0
382	0.002	331	0.063	344	0.078	295	1.822	382	0.002	331	0.063	344	0.078	295	1.822	134	15.0
203	0.111	230	0.578	218	0.771	257	3.847	200	0.111	230	0.578	215	0.771	256	3.847	350	0.3
255	0.052	241	0.411	231	0.642	238	6.172	254	0.052	241	0.411	229	0.642	237	6.172	194	2.3
200	0.116	229	0.584	209	0.928	246	4.790	198	0.116	229	0.584	207	0.928	245	4.790	304	1.2
246	0.058	247	0.379	279	0.323	266	3.145	245	0.058	246	0.379	278	0.323	266	3.145	172	10.5
267	0.039	260	0.317	311	0.153	294	1.914	266	0.039	260	0.317	311	0.153	294	1.914	239	3.3
199	0.117	251	0.352	153	2.401	254	4.105	197	0.117	250	0.352	146	2.401	253	4.105	70	39.4
219	0.088	243	0.404	211	0.889	272	2.886	215	0.088	243	0.404	209	0.889	272	2.886	193	7.4
186	0.146	313	0.101	113	5.415	361	0.366	186	0.146	313	0.101	105	5.415	361	0.366	149	13.9
321	0.015	332	0.060	350	0.071	333	0.810	321	0.015	332	0.060	350	0.071	333	0.810	297	1.5
235	0.066	269	0.246	264	0.382	285	2.274	234	0.066	269	0.246	263	0.382	285	2.274	280	1.9
328	0.014	350	0.036	302	0.172	324	1.020	328	0.014	350	0.036	301	0.172	324	1.020	238	3.4
218	0.089	306	0.118	217	0.806	327	0.918	214	0.089	306	0.118	214	0.806	327	0.918	225	4.4
313	0.017	255	0.337	339	0.092	280	2.534	313	0.017	254	0.337	339	0.092	280	2.534	337	0.5
232	0.072	274	0.218	200	1.078	258	3.831	231	0.072	274	0.218	197	1.078	257	3.831	246	3.0
212	0.096	246	0.386	166	1.834	210	10.65	222	0.084	255	0.336	165	1.748	216	9.244	208	6.0
294	0.024	358	0.026	244	0.532	310	1.334	294	0.024	358	0.026	243	0.532	310	1.334	196	6.9
264	0.041	232	0.564	254	0.447	221	8.186	263	0.041	232	0.564	253	0.447	219	8.186	326	0.8
167	0.208	157	2.262	171	1.698	173	19.21	167	0.208	154	2.262	167	1.698	168	19.21	166	10.8
310	0.018	254	0.341	321	0.130	270	2.900	310	0.018	253	0.341	321	0.130	270	2.900	—	—
287	0.028	316	0.092	305	0.167	338	0.743	287	0.028	316	0.092	305	0.167	338	0.743	321	0.9
—	—	220	0.688	—	—	279	2.546	—	—	220	0.688	—	—	279	2.546	206	6.0
248	0.057	315	0.094	236	0.580	329	0.876	247	0.057	315	0.094	234	0.580	329	0.876	332	0.6
224	0.082	338	0.052	269	0.361	357	0.434	223	0.082	338	0.052	268	0.361	357	0.434	155	12.6
239	0.064	319	0.089	233	0.619	304	1.471	238	0.064	319	0.089	231	0.619	304	1.471	250	2.9
279	0.031	303	0.125	309	0.160	317	1.184	278	0.031	303	0.125	309	0.160	317	1.184		NA
389	0.001	344	0.041	390	0.007	342	0.715	389	0.001	344	0.041	390	0.007	342	0.715	334	0.6
263	0.041	307	0.111	295	0.201	334	0.807	262	0.041	307	0.111	294	0.201	334	0.807	319	0.9
312	0.017	287	0.172	293	0.229	261	3.410	312	0.017	287	0.172	292	0.229	261	3.410	221	4.5
282	0.030	280	0.193	318	0.134	276	2.764	282	0.030	280	0.193	318	0.134	276	2.764	231	4.3
307	0.019	359	0.024	282	0.278	268	3.094	307	0.019	359	0.024	281	0.278	268	3.094	227	4.4
286	0.028	340	0.051	262	0.390	335	0.788	286	0.028	340	0.051	261	0.390	335	0.788	274	2.1
381	0.002	328	0.072	392	0.006	293	1.953	381	0.002	328	0.072	392	0.006	293	1.953	270	2.1
277	0.033	304	0.119	196	1.163	256	3.969	276	0.033	304	0.119	194	1.163	255	3.969	222	4.5
272	0.036	250	0.356	322	0.129	306	1.413	271	0.036	249	0.356	322	0.129	306	1.413	313	1.1
275	0.034	231	0.567	281	0.310	232	6.693	274	0.034	231	0.567	280	0.310	230	6.693	283	1.7
271	0.037	292	0.152	255	0.443	281	2.474	270	0.037	292	0.152	254	0.443	281	2.474	271	2.1
320	0.015	196	0.994	330	0.108	231	6.739	320	0.015	195	0.994	330	0.108	229	6.739	264	2.3
278	0.032	240	0.459	298	0.189	249	4.569	277	0.032	240	0.459	297	0.189	248	4.569	360	0.1

Rank by total assets	Company	Total assets ($000)	Total revenue		Net income		Stockholders' equity		Capital & Expl. spending	
			Rank	($000)	Rank	($000)	Rank	($000)	Rank	($000)
307	Columbine Exploration Corp.[64]	6,757	301	2,249	205	306	313	1,621	289	1,332
308	Cobb Resources Corp.[29]	6,679	268	4,110	164	1,136	284	2,666	278	1,517
309	Energy Assets International Corp.[35]	6,541	299	2,437	233	25	274	3,073	230	3,372
310	QED Exploration Inc.[77]	6,525	304	2,205	187	605	244	4,929	253	2,198
311	Mustang Drilling & Exploration Inc.	6,410	269	4,021	255	(131)	237	5,436	288	1,360
312	Prima Energy Corp.[29]	6,399	306	2,001	191	483	241	5,051	343	511
313	Marlin Oil Co.[52]	6,272	324	1,319	269	(294)	322	1,322	342	517
314	Henderson Petroleum Corp.	6,192	316	1,639	291	(537)	297	2,156	316	973
315	Great American Resources Inc.	5,762	317	1,604	234	18	243	4,957	376	142
316	Melton Drilling & Exploration Co.	5,548	274	3,662	276	(376)	259	3,771	359	319
317	Dallas Oil & Minerals Inc.	5,544	331	1,146	201	339	235	5,485	333	670
318	Parallel Petroleum Corp.	5,275	319	1,499	297	(652)	249	4,626	239	2,965
319	Usenco Inc.[50]	5,215	305	2,143	305	(838)	345	725	255	2,149
320	Circle Seven Oil & Gas Inc.[60]	4,903	336	1,040	257	(166)	279	2,843	290	1,331
321	Newport Petroleum Inc.[20]	4,736	333	1,081	281	(415)	257	3,970	296	1,212
322	Intramerican Oil & Minerals Inc.	4,692	311	1,839	220	110	280	2,758	320	839
323	Sparkman Producing Co.	4,671	310	1,843	323	(1,218)	263	3,559	298	1,198
324	Ridgeway EXCO Inc.[88]	4,660	351	802	232	25	271	3,306	313	1,016
325	Regal Petroleum Ltd.[14]	4,620	320	1,498	196	377	270	3,394	281	1,488
326	Petra Resources Inc.[20]	4,594	328	1,289	267	(227)	273	3,154	331	681
327	Falcon Oil & Gas Co. Inc.[20]	4,535	335	1,050	199	354	289	2,475	322	805
328	Midwest Exploration Inc.[8]	4,480	322	1,426	211	189	298	2,114	282	1,487
329	Lyric Energy Inc.[52]	4,427	372	500	262	(192)	304	1,928	371	184
330	Reef Energy Corp.	4,251	297	2,492	314	(944)	314	1,600	306	1,088
331	Aspen Exploration Corp.[29]	4,235	339	924	271	(319)	264	3,529	377	140
332	Tyrex Oil Co.[29]	4,224	365	554	302	(750)	253	4,190	279	1,509
333	NP Energy Corp.[35]	4,222	364	574	292	(559)	321	1,337	387	64
334	Love Oil Co. Inc.[60]	4,200	291	2,835	160	1,230	266	3,503	314	1,013
335	Transierra Exploration Corp.[50]	4,176	302	2,242	359	(4,713)	292	2,446	311	1,059
336	Roberts Oil & Gas Inc.[60]	4,130	360	629	280	(408)	262	3,610	327	749
337	Aztec Resources Corp.[35]	4,044	344	839	215	150	260	3,688	268	1,750
338	States Exploration Ltd.[35]	4,036	354	764	301	(701)	269	3,398	297	1,211
339	Search Natural Resources Inc.[54]	3,924	308	1,955	183	679	277	2,928	345	469
340	Blackgold Energy Resources Inc.[35]	3,813	378	416	244	(51)	311	1,658	381	111
341	Crescent Oil & Gas Corp.[8]	3,738	377	438	250	(80)	267	3,438	379	130
342	Wentex International Inc.	3,725	315	1,736	192	464	325	1,244	312	1,033
343	Masters Energy Corp.	3,458	343	874	163	1,201	294	2,304	346	424
344	Aracca Petroleum Corp.	3,452	345	838	321	(1,176)	275	3,055	336	625
345	Energy Capital Development Corp.	3,449	383	362	337	(2,232)	303	1,935	374	177
346	Hubco Exploration Inc.	3,366	325	1,317	237	11	323	1,293	292	1,270
347	Bengal Oil & Gas Corp.	3,354	370	511	332	(1,929)	324	1,291	283	1,470
348	Reserve Exploration Co.[35]	3,326	349	823	251	(88)	281	2,746	287	1,368
349	Double Eagle Pet. & Mining Co.[14]	3,291	321	1,445	239	6	295	2,191	317	915
350	Plano Petroleum Corp.[8]	3,253	353	799	229	41	272	3,160	355	338
351	Albion International Resources Inc.	3,248	348	828	247	(58)	308	1,720	261	1,912
352	Oil City Petroleum Inc.[14]	3,194	347	832	287	(494)	339	833	305	1,092
353	Southern Mineral Corp.	3,165	307	1,999	235	15	305	1,840	265	1,778
354	Toklan Oil Corp.[14]	3,141	323	1,324	252	(106)	286	2,528	349	413
355	Calvin Exploration Inc.[8]	3,077	376	439	317	(1,070)	290	2,456	319	864
356	Oxford Exploration Co.[29]	3,008	318	1,540	210	201	288	2,478	299	1,185
357	Universal Fuels Co.[60]	2,900	338	928	283	(463)	348	657	394	40

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	(Mill bbl)	Rank	(Bcf)	Rank	Wells
253	0.053	337	0.052	234	0.608	277	2.726	252	0.053	337	0.052	232	0.608	277	2.726	211	5.4
223	0.085	324	0.081	163	1.945	287	2.245	219	0.085	324	0.081	158	1.945	287	2.245	229	4.4
355	0.007	368	0.014	312	0.151	345	0.637	355	0.007	368	0.014	312	0.151	345	0.637	—	—
251	0.055	312	0.101	252	0.451	337	0.776	250	0.055	312	0.101	251	0.451	337	0.776	181	9.5
333	0.012	385	0.004	353	0.062	292	1.955	333	0.012	385	0.004	353	0.062	292	1.955	203	6.3
354	0.007	311	0.104	374	0.027	298	1.648	354	0.007	311	0.104	374	0.027	298	1.648	284	1.7
306	0.019	283	0.186	304	0.169	303	1.481	306	0.019	283	0.186	304	0.169	303	1.481	243	3.1
258	0.046	310	0.105	280	0.313	343	0.707	257	0.046	310	0.105	279	0.313	343	0.707	320	6.8
360	0.006	322	0.087	366	0.038	314	1.239	360	0.006	322	0.087	366	0.038	314	1.239	--	NA
367	0.005	382	0.005	362	0.043	371	0.176	366	0.005	382	0.005	362	0.043	371	0.176	292	1.6
319	0.015	296	0.146	349	0.071	322	1.087	319	0.015	296	0.146	349	0.071	321	1.087	254	2.7
327	0.014	279	0.201	287	0.262	288	2.199	327	0.014	279	0.201	286	0.262	288	2.199	260	2.4
326	0.014	308	0.108	202	1.060	262	3.343	326	0.014	308	0.108	199	1.060	262	3.343	199	6.8
375	0.003	284	0.184	381	0.017	332	0.837	375	0.003	284	0.184	381	0.017	332	0.837	230	4.3
332	0.012	281	0.192	352	0.066	305	1.425	332	0.012	281	0.192	352	0.066	305	1.425	277	2.0
303	0.020	265	0.277	289	0.241	265	3.208	303	0.020	265	0.277	288	0.241	265	3.208	290	1.6
281	0.030	264	0.279	297	0.190	301	1.603	281	0.030	264	0.279	296	0.190	301	1.603	289	1.6
300	0.021	379	0.008	319	0.133	367	0.271	300	0.021	379	0.008	319	0.133	367	0.271	180	9.8
291	0.025	295	0.149	288	0.248	289	2.104	291	0.025	295	0.149	287	0.248	289	2.104	213	5.4
353	0.007	347	0.037	325	0.121	354	0.477	353	0.007	347	0.037	325	0.121	354	0.477	331	0.7
380	0.002	258	0.321	368	0.036	198	13.65	380	0.002	258	0.321	368	0.036	193	13.65	341	0.5
274	0.035	293	0.150	273	0.340	328	0.909	273	0.035	293	0.150	272	0.340	328	0.909	311	1.1
345	0.009	336	0.054	314	0.142	218	9.292	345	0.009	336	0.054	314	0.142	215	9.292	262	2.4
273	0.035	257	0.323	331	0.106	323	1.081	272	0.035	257	0.323	331	0.106	323	1.081	287	1.7
298	0.022	346	0.037	290	0.240	340	0.724	298	0.022	346	0.037	289	0.240	340	0.724	351	0.3
366	0.005	392	(s)	363	0.042	395	0.005	365	0.005	392	(s)	363	0.042	395	0.005	358	0.2
388	0.001	289	0.169	388	0.010	286	2.249	388	0.001	289	0.169	388	0.010	286	2.249	—	—
342	0.010	345	0.040	371	0.029	388	0.036	342	0.010	345	0.040	371	0.029	388	0.036	322	0.9
262	0.041	271	0.235	338	0.096	381	0.091	261	0.041	271	0.235	338	0.096	381	0.091	214	5.3
341	0.010	321	0.087	340	0.091	339	0.734	341	0.010	321	0.087	340	0.091	339	0.734	310	1.1
317	0.016	330	0.063	301	0.173	348	0.600	317	0.016	330	0.063	300	0.173	348	0.600	174	10.0
285	0.029	375	0.011	285	0.266	375	0.126	285	0.029	375	0.011	284	0.266	375	0.126	266	2.2
284	0.029	—	—	272	0.341	—	—	284	0.029	—	—	271	0.341	—	—	344	0.4
359	0.006	370	0.012	274	0.329	271	2.891	359	0.006	370	0.012	273	0.329	271	2.891	345	0.4
352	0.007	318	0.089	316	0.135	264	3.237	352	0.007	318	0.089	316	0.135	264	3.237	293	1.5
340	0.010	236	0.480	317	0.134	240	5.966	340	0.010	236	0.480	317	0.134	239	5.966	247	3.0
302	0.020	342	0.046	326	0.120	369	0.260	302	0.020	342	0.046	326	0.120	369	0.260	269	2.2
311	0.017	—	—	320	0.132		—	311	0.017	—	—	320	0.132			242	3.1
374	0.003	351	0.035	375	0.023	362	0.364	374	0.003	351	0.035	375	0.023	362	0.364	—	—
290	0.025	290	0.165	283	0.274	296	1.761	290	0.025	290	0.165	282	0.274	296	1.761	338	0.5
396	(s)	297	0.145	367	0.037	252	4.260	396	(s)	297	0.145	367	0.037	251	4.260	359	0.1
293	0.024	353	0.032	278	0.323	368	0.266	293	0.024	353	0.032	277	0.323	368	0.266	237	3.4
261	0.045	341	0.050	270	0.358	319	1.142	260	0.045	341	0.050	269	0.358	319	1.142	329	0.7
318	0.015	360	0.022	334	0.100	349	0.588	318	0.015	360	0.022	334	0.100	349	0.588	296	1.5
325	0.014	355	0.031	260	0.405	311	1.321	325	0.014	355	0.031	259	0.405	311	1.321	333	0.6
289	0.027	384	0.004	242	0.565	386	0.039	289	0.027	384	0.004	240	0.565	386	0.039	—	—
316	0.016	349	0.036	337	0.097	309	1.337	316	0.016	349	0.036	337	0.097	309	1.337	244	3.1
339	0.010	273	0.222	364	0.040	318	1.175	339	0.010	273	0.222	364	0.040	318	1.175	300	1.4
387	0.001	314	0.099	393	0.005	347	0.608	387	0.001	314	0.099	393	0.005	347	0.608	279	1.9
257	0.051	363	0.018	294	0.218	377	0.120	256	0.051	363	0.018	293	0.218	377	0.120	—	NA
301	0.020	326	0.078	365	0.039	359	0.374	301	0.020	326	0.078	365	0.039	359	0.374	—	—

Rank by total assets	Company	Total assets ($000)	Total revenue		Net income		Stockholders' equity		Capital & Expl. spending	
			Rank	($000)	Rank	($000)	Rank	($000)	Rank	($000)
358	**Western Natural Gas Co.**	2,846	356	732	335	(2,001)	296	2,158	245	2,481
359	**Crown Resource Corp.**	2,825	367	548	221	92	282	2,696	301	1,152
360	**Sunbelt Exploration Inc.**[14]	2,779	340	923	238	8	318	1,550	360	259
361	**Impact Energy Inc.**	2,695	363	576	288	(502)	291	2,450	332	678
362	**Cheyenne Resources Inc.**	2,682	298	2,487	225	72	302	1,949	348	416
363	**Tide West Oil Co.**[84]	2,576	381	397	304	(836)	285	2,562	295	1,218
364	**Grayhill Exploration Co.**[60]	2,560	380	405	296	(644)	287	2,525	363	249
365	**Wicklund Petroleum Corp.**	2,553	337	1,031	320	(1,146)	317	1,559	323	802
366	**Blue Jay Energy Corp.**	2,491	332	1,097	270	(307)	310	1,685	335	642
367	**Texoil Inc.**	2,372	375	444	284	(472)	316	1,573	291	1,307
368	**Amber Resources Company**	2,371	327	1,295	336	(2,114)	312	1,656	338	553
369	**Trans Atlantic Resource Corp.**[29]	2,342	330	1,230	308	(908)	327	1,204	337	575
370	**Ambra Oil & Gas Co.**	2,335	341	897	228	44	326	1,243	350	401
371	**Comanche Oil Exploration Inc.**[35]	2,266	361	598	253	(109)	301	1,966	365	215
372	**Loch Exploration Inc.**	2,013	373	481	278	(394)	362	125	392	42
373	**LR Co.**[29]	1,932	371	506	298	(659)	363	(477)	329	697
374	**Big Piney Oil & Gas Co.**	1,834	366	552	224	74	306	1,734	382	99
375	**International Royalty & Oil Co.**[8]	1,782	374	464	230	32	309	1,693	369	203
376	**Sharon Energy Ltd.**[35,85]	1,767	385	351	258	(169)	355	466	378	137
377	**PETX Petroleum Corp.**[29]	1,628	359	632	219	110	336	921	347	423
378	**TriValley Oil & Gas Corp.**[77]	1,609	362	588	240	4	356	411	367	214
379	**EMC Energies Inc.**[29]	1,596	350	814	282	(462)	331	1,032	341	530
380	**Shaw Resources Inc.**[35]	1,489	382	394	222	91	333	993	358	320
381	**Amacan Resources Corp.**[52]	1,334	368	547	227	58	330	1,090	368	208
382	**Wyoming Oil & Minerals Co.**[84]	1,260	384	356	226	70	343	737	362	250
383	**Natura Energy Corp.**	1,248	334	1,068	195	393	337	904	326	752
384	**Mountain States Resources Corp.**[35]	1,151	395	133	313	(942)	350	576	395	9
385	**Pioneer Oil & Gas Corp.**[8]	1,139	357	667	242	(21)	332	1,017	383	98
386	**Roseland Oil & Gas Inc.**[20]	1,107	386	350	216	147	354	498	364	225
387	**Score Exploration Corp.**[29]	1,104	392	169	260	(181)	329	1,091	390	56
388	**Arrowhead Energy Corp.**[89]	1,012	396	96	261	(183)	335	922	386	82
389	**Bolyard Oil & Gas Ltd.**[52]	1,004	369	511	249	(71)	353	515	391	45
390	**Golden Triangle Royalty & Oil Inc.**	966	397	94	268	(289)	334	964	385	88
391	**Bronco Oil & Gas Co.**[8]	901	391	191	289	([illegible]1)	364	(1,404)	373	183
392	**TPEX Exploration Inc.**[29]	895	387	335	309	(912)	340	789	366	214
393	**Energy Production Co.**	891	388	325	264	(219)	341	776	372	183
394	**Black Giant Oil Co.**[35]	810	399	77	259	(174)	349	589	393	41
395	**Imperial Energy Corp.**[8]	778	390	270	243	(31)	344	734	351	397
396	**Crown Energy Corp.**	732	394	141	241	(10)	346	705	389	63
397	**Houston Oil & Energy Inc.**[29]	590	400	53	256	(157)	351	546	375	157
398	**Croff Oil Co.**	533	379	405	236	14	360	237	384	97
399	**Trinity Oil & Gas Inc.**[8]	441	393	162	275	(374)	357	371	381	110
400	**Petroleum Land Corp.**[50]	276	398	89	246	(56)	359	255	361	255
	Total	**536,157,180**		**582,428,040**		**24,475,235**		**197,587,160**		**65,747,667**

NA   Not available (s)   less than 500 bbl or 500 Mcf Fiscal yearend is Dec 31 unless otherwise noted 1 Formerly Standard Oil Co (Indiana) 2 Subsidiary of U.S. Steel Corp 3 Identifiable assets 4 Operating income after foreign income taxes 5 Subsidiary of E I duPont de Nemours Corp 6 After-tax operating income 7 Since fiscal yearend, has purchased Houston Natural Gas 8 Fiscal yearend Sept 30 9 Since fiscal yearend, has been purchased by Coastal Corp 10 Includes insignificant amounts of Canadian reserves 11 Since fiscal yearend, has been purchased by InterNorth 12 Five months ended Dec 31 Changed fiscal yearend from July 31 13 Production and reserves figures include most of reserves also listed under Transco Exploration Partners 14 Fiscal yearend Aug 31 15 Since fiscal yearend, has purchased American Natural Resources 16 Subsidiary of Union Pacific Corp 17 Subsidiary of Allied Corp 18 Mostly natural gas liquids production 19 Includes

crude oil reserves only Does not include natural gas liquids 20 Fiscal yearend
21 Subsidiary of Burlington Northern Inc 22 Formerly American Petrofina 23
of W R Grace Co 24 Production and reserves figures include most of the reserves
under Transco Energy 25 Partners' capital 26 Subsidiary of Santa Fe Southern
27 Identifiable assets for Santa Fe Southern Pacific's Natural Resources Group which
some coal mining operations 28 Formerly Mountain Fuel Supply 29 Fiscal
30 30 Oil and gas producing subsidiary is Fuel Resources Inc 31 Subsidiary of
and Ultramar PLC Formerly Enstar Corp 32 Six months ended Dec 31 33
Goodyear Tire & Rubber Co 34 Formerly Equitable Gas Co 35 Fiscal yearend
36 Subsidiary of CSX Corp 37 Subsidiary of Monsanto Corp 38 Formerly Yankee
Co 39 Since fiscal yearend, has transferred all producing properties to Plains
40 Subsidiary of Broken Hill Proprietary Co Ltd Formerly Energy Reserves Group 41

Worldwide liquids production Rank	(Mill bbl)	Worldwide natural gas production Rank	(Bcf)	Worldwide liquids reserves Rank	(Mill bbl)	Worldwide natural gas reserves Rank	(Bcf)	U.S. liquids production Rank	(Mill bbl)	U.S. natural gas production Rank	(Bcf)	U.S. liquids reserves Rank	(Mill bbl)	U.S. natural gas reserves Rank	(Bcf)	U.S. net wells drilled Rank	Wells
324	0.014	323	0.081	356	0.057	351	0.526	324	0.014	323	0.081	356	0.057	351	0.526	—	NA
351	0.007	—	—	328	0.113	—	—	351	0.007	—	—	328	0.113	—	—	261	2.4
394	(s)	291	0.164	396	0.001	313	1.270	394	(s)	291	0.164	396	0.001	313	1.270	327	0.8
329	0.013	376	0.009	332	0.105	383	0.050	329	0.013	376	0.009	332	0.105	383	0.050	190	7.8
323	0.014	325	0.078	313	0.142	353	0.508	323	0.014	325	0.078	313	0.142	353	0.508	312	1.1
349	0.008	390	0.002	341	0.090	376	0.120	349	0.008	390	0.002	341	0.090	376	0.120	201	6.3
386	0.001	391	(s)	376	0.022	385	0.039	386	0.001	391	(s)	376	0.022	385	0.039	305	1.2
338	0.010	298	0.139	345	0.076	315	1.216	338	0.010	298	0.139	345	0.076	315	1.216	298	1.4
315	0.016	301	0.131	354	0.058	346	0.610	315	0.016	301	0.131	354	0.058	346	0.610	309	1.1
358	0.006	327	0.073	357	0.051	316	1.194	358	0.006	327	0.073	357	0.051	316	1.194	218	4.7
373	0.003	259	0.320	383	0.013	355	0.475	373	0.003	259	0.320	383	0.013	355	0.475	342	0.5
370	0.004	378	0.008	389	0.009	391	0.024	370	0.004	378	0.008	389	0.009	391	0.024	346	0.4
348	0.008	339	0.051	347	0.075	275	2.783	348	0.008	339	0.051	347	0.075	275	2.783	273	2.1
344	0.009	317	0.089	315	0.140	365	0.286	344	0.009	317	0.089	315	0.140	365	0.286	—	—
350	0.007	365	0.016	323	0.128	370	0.234	350	0.007	365	0.016	323	0.128	370	0.234	340	0.5
322	0.014	389	0.002	299	0.183	393	0.018	322	0.014	389	0.002	298	0.183	393	0.018	324	0.8
397	(s)	245	0.394	397	(s)	259	3.606	397	(s)	245	0.394	397	(s)	258	3.606	348	0.3
379	0.002	364	0.016	379	0.021	373	0.168	379	0.002	364	0.016	379	0.021	373	0.168	—	NA
378	0.002	335	0.054	391	0.006	312	1.288	378	0.002	335	0.054	391	0.006	312	1.288	—	NA
305	0.019	374	0.011	333	0.103	356	0.459	305	0.019	374	0.011	333	0.103	356	0.459	220	4.7
393	(s)	305	0.118	382	0.013	320	1.138	393	(s)	305	0.118	382	0.013	320	1.138	343	0.4
304	0.019	329	0.071	296	0.193	350	0.563	304	0.019	329	0.071	295	0.193	350	0.563	308	1.1
—	—	—	—	184	1.490	308	1.366	—	—	—	—	182	1.490	308	1.366	325	0.8
314	0.016	348	0.036	343	0.083	363	0.346	314	0.016	348	0.036	343	0.083	363	0.346	339	0.5
331	0.012	388	0.002	336	0.098	344	0.684	331	0.012	388	0.002	336	0.098	344	0.684	347	0.4
347	0.008	343	0.044	369	0.031	366	0.273	347	0.008	343	0.044	369	0.031	366	0.273	288	1.6
365	0.005	386	0.003	361	0.043	389	0.035	364	0.005	386	0.003	361	0.043	389	0.035	—	NA
372	0.003			378	0.021	382	0.081	372	0.003	—		378	0.021	382	0.081	314	1.0
364	0.005	354	0.031	360	0.046	364	0.310	363	0.005	354	0.031	360	0.046	364	0.310	—	NA
363	0.005			359	0.047			369	0.005			359	0.047	—			—
391	(s)	367	0.014	355	0.057	331	0.840	391	(s)	367	0.014	355	0.057	331	0.840	—	—
369	0.004	334	0.055	358	0.050	267	3.114	368	0.004	334	0.055	358	0.050	267	3.114	357	0.2
385	0.001	377	0.008	387	0.010	379	0.100	385	0.001	377	0.008	387	0.010	378	0.100	—	NA
362	0.005	373	0.011	386	0.010	384	0.041	362	0.005	373	0.011	386	0.010	384	0.041	—	—
357	0.006	352	0.033	370	0.030	374	0.159	357	0.006	352	0.033	370	0.030	374	0.159	275	2.0
346	0.008	372	0.011	342	0.083	372	0.168	346	0.008	372	0.011	342	0.083	372	0.168	349	0.3
384	0.001	381	0.005	394	0.003	390	0.026	384	0.001	381	0.005	394	0.003	390	0.026	—	NA
361	0.005	383	0.004	372	0.028	380	0.097	361	0.005	383	0.004	372	0.028	380	0.097	232	4.3
377	0.002	362	0.018	380	0.019	358	0.383	377	0.002	362	0.018	380	0.019	360	0.383	—	NA
392	(s)	371	0.011	395	0.002	387	0.037	392	(s)	371	0.011	395	0.002	387	0.037	—	NA
335	0.011	357	0.027	377	0.021	378	0.110	335	0.011	357	0.027	377	0.021	378	0.110		NA
368	0.004	380	0.005	385	0.010	394	0.016	367	0.004	380	0.005	385	0.010	394	0.016	335	0.6
383	0.001	369	0.013	291	0.239	284	2.292	383	0.001	369	0.013	290	0.239	284	2.292		
	3,509.365		**12,863.565**		**35,704.721**		**186,301.652**		**2,239.378**		**10,267.370**		**22,665.308**		**134,252.478**		**18,569.1**

Subsidiary of Home Oil Corp. 42 Subsidiary of Fluor Corp. 43 Subsidiary of Houston Industries. 44 Subsidiary of Centex Corp. 45 Subsidiary of Kaiser Aluminum & Chemical Corp. 46 Subsidiary of Penn Central Corp. 47 Subsidiary of Southdown Inc. 48 Operating income before taxes and interest. 49 Subsidiary of DeKalb AgResearch Inc. Data also includes DeKalb's Canadian oil and gas operations. 50 Fiscal yearend Oct. 31. 51 Subsidiary of Placer Development Ltd. 52 Fiscal yearend Apr. 30. 53 Company is operating under Chapter 11. 54 Subsidiary of Consumers Power Co. 55 Subsidiary of CBI Industries Inc. 56 At Oct. 31. 57 Subsidiary of Homestake Mining. 58 Subsidiary of Moore McCormack Resources Inc. 59 U.S. operations only. 60 Fiscal yearend May 31. 61 Company is in the process of selling its oil and gas subsidiary. 62 Formerly Worldwide Energy Corp. 63 Four months ended Jan. 30. 64 Fiscal yearend Nov. 30. 65 Four months ended Dec. 31. 66 Trust Corpus. 67 Subsidiary of Gulf Resources & Chemical Corp. 68 Operating loss. 69 Subsidiary of International Minerals & Chemical Corp. 70 Subsidiary of AMAX Inc. 71 Subsidiary of National Distillers & Chemical Corp. 72 Estimate based on prior year figures. 73 Formerly McCormick Oil & Gas Co. 74 Oil and gas operations only. 75 Operating profit. 76 Formerly HCW Oil & Gas Co. 77 Fiscal yearend July 31. 78 Subsidiary of Public Service Co. of Colorado. 79 Production is natural gas liquids resulting from pipeline operations. 80 Company is chartered in Canada but operates exclusively in the U.S. 81 Formerly Deep Gas Exploration Inc. 82 Formerly Royalty Ventures Corp. 83 Subsidiary of Reichhold Chemicals Inc. 84 Fiscal yearend Feb. 29. 85 Canadian company which operates mostly in the U.S. Financial figures converted to U.S. dollars. 86 Subsidiary of Northwest Natural Gas Co. 87 Formerly Keith Collins Petroleum Corp. 88 Nine months ended Dec. 31. Fiscal yearend changed from Mar. 31. 89 Since fiscal yearend, has been purchased by Reliance Enterprises.

The top 20 in U.S. and world liquids reserves

Rank	Company name	U.S. liquids reserves (Mill bbl)	Rank	Company name	World liquids reserves (Mill bbl)
1	Standard Oil Co (Ohio)	2,903.0	1	Exxon Corp	6,474.0
2	Atlantic Richfield Co	2,746.0	2	Texaco Inc	3,249.0
3	Exxon Corp	2,715.0	3	Atlantic Richfield Co	2,941.0
4	Shell Oil Co	2,321.0	4	Standard Oil Co (Ohio)	2,903.0
5	Texaco Inc	1,887.0	5	Amoco Corp	2,618.0
6	Amoco Corp	1,737.0	6	Mobil Corp	2,440.0
7	Chevron Corp	1,328.0	7	Shell Oil Co	2,436.0
8	Mobil Corp	1,041.0	8	Chevron Corp	2,073.0
9	Sun Co	745.0	9	Conoco Corp	1,390.0
10	Unocal Corp	663.0	10	Philips Petroleum Co	1,110.0
11	Phillips Petroleum Co	659.0	11	Marathon Oil Corp	1,081.4
12	Marathon Oil Corp	575.6	12	Occidental Petroleum Corp	1,011.0
13	Conoco Corp	366.0	13	Sun Co	896.0
14	Occidental Petroleum Corp	263.0	14	Unocal Corp	853.0
15	Tenneco Inc	252.0	15	Amerada Hess Corp	699.0
16	Amerada Hess Corp	228.0	16	Tenneco Inc	369.0
17	Champlin Petroleum Co	179.1	17	Champlin Petroleum Co	179.1
18	Pennzoil Co	125.0	18	Texas Eastern Corp	179.1
19	Mitchell Energy & Development Corp	114.7	19	Union Texas Petroleum Co	155.0
20	Southland Royalty Co	69.7	20	Diamond Shamrock Corp	144.1

The top 20 in U.S. and world liquids production

Rank	Company name	U.S. liquids production (Mill bbl)	Rank	Company name	World liquids production (Mill bbl)
1	Exxon Corp	285.0	1	Exxon Corp	590.0
2	Atlantic Richfield Corp	240.0	2	Texaco Inc	374.0
3	Standard Oil Co (Ohio)	232.0	3	Amoco Corp	310.0
4	Texaco Inc	210.0	4	Atlantic Richfield Co	261.0
5	Shell Oil Co	195.0	5	Standard Oil Co (Ohio)	232.0
6	Amoco Corp	149.0	6	Mobil Corp	217.0
7	Chevron Corp	115.0	7	Shell Oil Co	200.0
8	Mobil Corp	113.0	8	Chevron Corp	174.0
9	Sun Co	71.0	9	Conoco Corp	131.0
10	Phillips Petroleum Co	62.0	10	Phillips Petroleum Co	114.0
11	Marathon Oil Corp	59.8	11	Occidental Petroleum Corp	113.0
12	Unocal Corp	59.0	12	Marathon Oil Corp	94.7
13	Conoco Corp	44.0	13	Sun Co	82.0
14	Tenneco Inc	36.0	14	Unocal Corp	71.0
15	Occidental Petroleum Corp	30.0	15	Amerada Hess Corp	61.0
16	Amerada Hess Corp	26.0	16	Tenneco Inc	50.0
17	Champlin Petroleum Corp	25.1	17	Union Texas Petroleum Co	31.0
18	Santa Fe Energy Co	17.7	18	Diamond Shramrock Corp	26.8
19	Mitchell Energy & Development Corp	16.7	19	Champlin Petroleum Co	25.1
20	Louisiana Land & Exploration Co	13.2	20	Murphy Oil Corp	20.8

The top 20 in U.S. and world gas production

Rank	Company name	U.S. gas production (Bcf)	Rank	Company name	World gas production (Bcf)
1	Exxon Corp	977.0	1	Exxon Corp	1,622.0
2	Texaco Inc	944.0	2	Mobil Corp	1,164.0
3	Amoco Corp	694.0	3	Texaxo Corp	1,053.0
4	Mobil Corp	607.0	4	Amoco Corp	1,019.0
5	Shell Oil Co	590.0	5	Shell Oil Co	596.0
6	Atlantic Richfield Co	524.0	6	Atlantic Richfield Co	536.0
7	Chevron Corp	443.0	7	Chevron Corp	519.0
8	Tenneco Inc	435.0	8	Phillips Petroleum Co	473.0
9	Unocal Corp	325.0	9	Tenneco Inc	435.0
10	Sun Co	287.0	10	Unocal Corp	409.0
11	Phillips Petroleum Co	286.0	11	Sun Co	319.0
12	Occidental Petroleum Corp	249.0	12	Conoco Corp	307.0
13	Conoco Corp	248.0	13	Occidental Petroleum Corp	258.0
14	Texas Oil & Gas Corp	177.2	14	Marathon Oil Corp	216.2
15	Pennzoil Co	152.0	15	Amerada Hess Corp	178.0
16	Marathon Oil Corp	144.2	16	Texas Oil & Gas Corp	177.2
17	Consolidated Natural Gas Co	127.0	17	Pennzoil Co	163.0
18	Champlin Petroleum Co	121.7	18	Union Texas Petroleum Co	159.0
19	Meridian Oil Inc	105.0	19	Consolidated Natural Gas Co	127.0
20	Mesa Petroleum Co	103.2	20	Champlin Petroleum Co	121.7

The top 20 in U.S. and world gas reserves

Rank	Company name	U.S. gas reserves (Bcf)	Rank	Company name	World gas reserves (Bcf)
1	Exxon Corp	17,884.0	1	Exxon Corp	29,785.0
2	Atlantic Richfield Co	14,288.0	2	Mobil Corp	21,922.0
3	Amoco Corp	9,684.0	3	Amoco Corp	15,202.0
4	Mobil Corp	8,092.0	4	Atlantic Richfield Co	15,087.0
5	Shell Oil Co	7,455.0	5	Texaco Inc	9,590.0
6	Standard Oil Co (Ohio)	6,972.1	6	Shell Oil Co	7,703.0
7	Texaco Inc	6,539.0	7	Standard Oil Co (Ohio)	6,972.1
8	Unocal Corp	4,824.0	8	Chevron Corp	6,448.0
9	Chevron Corp	4,583.0	9	Unocal Corp	6,194.0
10	Phillips Petroleum Co	3,925.0	10	Phillips Petroleum Co	6,114.0
11	Tenneco Inc	3,539.0	11	Tenneco Inc	3,545.0
12	Sun Co	2,728.0	12	Marathon Oil Corp	3,242.9
13	Meridian Oil Inc	2,517.0	13	Sun Co	3,211.0
14	Occidental Petroleum Corp	2,385.0	14	Conoco Corp	2,868.0
15	Conoco Corp	2,182.0	15	Occidental Petroleum Corp	2,607.0
16	Champlin Petroleum Co	1,896.4	16	Meridian Oil Co	2,517.0
17	Marathon Oil Corp	1,758.2	17	Union Texas Petroleum Co	2,449.0
18	Texas Oil & Gas Corp	1,639.8	18	Champlin Petroleum Co	1,896.4
19	Panhandle Eastern Corp	1,354.9	19	Amerada Hess Corp	1,879.0
20	Mesa Petroleum Co	1,343.3	20	Texas Oil & Gas Corp	1,639.8

The OGJ 400 Company Index

Rank by total assets	Company name	Headquarters city
162	**AMAX Petroleum Corp.**	Houston
218	**Adams Resources & Energy Inc.**	Houston
99	**Adobe Oil & Gas Corp.**	Midland, TX
152	**Alamco Inc**	Clarksburg, WV
351	**Albion International Resources Inc.**	Newport Beach, CA
241	**Alexander Energy Corp.**	Oklahoma City
147	**Allegheny & Western Energy Corp.**	Charleston WV
304	**Alta Energy Corp.**	Midland, TX
266	**Altex Oil Corp**	Denver
381	**Amacan Resources Corp.**	Salt Lake City
124	**Amarex Inc.**	Oklahoma City
368	**Amber Resources Co.**	Denver
370	**Ambra Oil & Gas Co.**	Salt Lake City
16	**Amerada Hess Corp.**	New York
253	**American Exploration Co.**	Houston
248	**American Frontier Exploration Inc.**	Beverly Hills, CA
226	**American National Petroleum Co.**	Houston
25	**American Natural Resources Co**	Detroit
134	**American Quasar Petroleum Co.**	Fort Worth
5	**Amoco Corp.**	Chicago
272	**Antares Oil Corp.**	Denver
95	**Apache Corp.**	Minneapolis
75	**Apache Petroleum Corp.**	Minneapolis
344	**Aracca Petroleum Corp.**	New York
233	**Arapaho Petroleum Inc**	Englewood, CO
160	**Argo Petroleum Corp.**	Santa Monica, CA
250	**Argonaut Energy Corp.**	Amarillo, TX
51	**Arkla Inc**	Little Rock, AR
388	**Arrowhead Energy Corp.**	Midvale, UT
156	**Asamera Inc**	Calgary, Alberta, Can
24	**Ashland Oil Inc.**	Ashland, KY
331	**Aspen Exploration Corp.**	Denver
7	**Atlantic Richfield Co.**	Los Angeles
337	**Aztec Resources Corp.**	Denver
96	**BHP Petroleum (Americas) Inc.**	Wichita
216	**Baruch-Foster Corp**	Dallas
224	**Basic Earth Science Systems Inc.**	Englewood, CO
303	**Bayou Resources Inc**	Houston
178	**Beard Oil Co.**	Oklahoma City
243	**Bellwether Exploration Co.**	Denver
347	**Bengal Oil & Gas Corp.**	Seabrook, TX
374	**Big Piney Oil & Gas Co.**	Salt Lake City
394	**Black Giant Oil Co.**	Cisco, TX
340	**Blackgold Energy Resources Inc.**	Englewood, CO
366	**Blue Jay Energy Corp**	Bala Cynwyd, PA
283	**Bluewater Oil & Gas Ltd**	Casper, WY
217	**Bogert Oil Co.**	Oklahoma City
389	**Bolyard Oil & Gas Ltd.**	Denver
136	**Bow Valley Petroleum Inc.**	Denver
193	**Bracken Exploration Co.**	Oklahoma City
229	**Brock Exploration Corp.**	New Orleans
391	**Bronco Oil & Gas Co.**	Denver
66	**Brooklyn Union Gas Co.**	Brooklyn, NY
282	**Burton/Hawks Inc.**	Casper WY
101	**Buttes Gas & Oil Co.**	Oakland, CA
82	**CENEX (Farmers Union Central Exchange Inc.)**	St. Paul, MN
49	**Cabot Corp.**	Boston
142	**Callon Petroleum Co.**	Natchez, MS
355	**Calvin Exploration Inc.**	Santa Fe, NM
242	**Cambridge Royalty Co.**	Houston
76	**Celeron Corp.**	Lafayette, LA
109	**Cenergy Corp.**	Dallas
301	**Centennial Petroleum Inc.**	Denver
292	**Century Oil & Gas Corp.**	Englewood, CO
37	**Champlin Petroleum Co.**	Houston
257	**Chaparral Resources Inc.**	Denver
174	**Chapman Energy Inc.**	Dallas
4	**Chevron Corp.**	San Francisco
362	**Cheyenne Resources Inc.**	Cheyenne, WY
173	**Chieftain Development Co. Ltd.**	Edmonton, Alberta Can
254	**Cibola Energy Corp.**	Albuquerque
320	**Circle Seven Oil & Gas Inc.**	Fort Worth
35	**Coastal Corp.**	Houston
308	**Cobb Resources Corp.**	Albuquerque
21	**Columbia Gas System**	Wilmington, DE
307	**Columbine Exploration Corp.**	Denver
371	**Comanche Oil Exploration Inc.**	Denver
230	**ConVest Energy Corp.**	Houston
15	**Conoco Inc.**	Houston
150	**Conquest Exploration Co.**	Houston
31	**Consolidated Natural Gas Co.**	Pittsburgh
149	**Consolidated Oil & Gas Inc.**	Denver
300	**Credo Petroleum Corp.**	Denver
341	**Crescent Oil & Gas Corp.**	Denver
398	**Croff Oil Co.**	Denver
89	**Crown Central Petroleum Corp.**	Baltimore, MD
396	**Crown Energy Corp.**	Salt Lake City
359	**Crown Resource Corp.**	Denver
97	**Crystal Oil Co.**	Shreveport, LA
317	**Dallas Oil & Minerals Inc.**	Fort Worth
104	**Damson Oil Corp.**	New York
279	**Deca Energy Corp.**	Denver
105	**DeltaUS Corp.**	Tyler, TX
119	**Depco Inc.**	Denver
19	**Diamond Shamrock Corp.**	Dallas
269	**Dietrich Resources Corp.**	Denver
275	**Discovery Oil Ltd.**	Los Angeles
349	**Double Eagle Petroleum & Mining Co.**	Casper, WY
187	**Drillers Inc.**	Houston
1[illegible]8	**Dyco Petroleum Corp.**	Minneapolis
379	**EMC Energies Inc.**	Casper, WY
302	**Eagle Exploration Co.**	Denver
309	**Energy Assets International Corp.**	New York
345	**Energy Capital Development Corp.**	Rosslyn, VA
206	**Energy Management Corp.**	Denver
247	**Energy Oil Inc.**	Longmont, CO
393	**Energy Production Co.**	Denver
189	**Energy Ventures Inc.**	Houston
207	**Enertec Corp.**	Amarillo, TX
306	**Enex Resources Corp.**	Kingwood, TX
34	**Enserch Corp.**	Dallas
111	**Ensource Inc.**	Englewood, CO
151	**Entex Energy Development Ltd.**	Houston
72	**Entex Inc.**	Houston
225	**Equitable Petroleum Corp.**	New York
78	**Equitable Resources Inc.**	Pittsburgh
185	**Equity Oil Co.**	Salt Lake City
180	**Ethyl Corp.**	Richmond, VA
220	**Euratex Corp.**	Fort Worth
298	**Evergreen Resources Inc.**	Denver
259	**Excel Energy Corp.**	Denver
1	**Exxon Corp.**	New York
327	**Falcon Oil & Gas Co. Inc.**	Odessa, TX
181	**Federated Natural Resources Corp.**	Traverse City, MI
132	**Felmont Oil Corp.**	New York
50	**Fina Oil & Chemical Co.**	Dallas
102	**First Mississippi Corp.**	Jackson, MS
161	**Flag-Redfern Oil Co.**	Midland, TX
100	**Fluor Oil & Gas Corp.**	Denver
91	**Forest Oil Corp.**	Denver
287	**Fossil Oil & Gas Inc.**	Oklahoma City
44	**Freeport-McMoRan Inc.**	New York
196	**Fuel Resources Development Co. (FUELCO)**	Denver
186	**GNC Energy Corp.**	Dallas
168	**Galaxy Oil Co.**	Wichita Falls, TX
256	**General Hydrocarbons Inc.**	Billings, MT
280	**GeoResources Inc.**	Williston, ND
273	**Geodyne Resources Inc.**	Tulsa
295	**Gerber Energy International Inc.**	Denver
45	**Global Marine Inc.**	Houston
158	**Global Natural Resources Inc.**	Houston
274	**Golden Oil Co.**	Denver
390	**Golden Triangle Royalty & Oil Inc.**	Cisco, TX
54	**Grace Natural Resources Group**	Dallas
364	**Grayhill Exploration Co.**	Arvada, CO
315	**Great American Resources Inc.**	San Diego
258	**Great Eastern Energy & Development Corp.**	Englewood, CO
270	**Greenwood Resources Inc.**	Englewood, CO
115	**Gulf Energy Development Corp.**	San Antonio
183	**HCW Inc.**	Boston
255	**HLH Petroleum Corp.**	Dallas
184	**Hadson Petroleum Corp.**	Oklahoma City
73	**Hamilton Oil Corp.**	Denver
219	**Harken Oil & Gas Inc.**	Abilene, TX
86	**Helmerich & Payne Inc.**	Tulsa
314	**Henderson Petroleum Corp.**	Denver
291	**Henry Energy Corp.**	Arlington, TX
208	**Hershey Oil Corp.**	Pasadena, CA
227	**High Plains Oil Corp.**	Denver
98	**Home Petroleum Corp.**	Denver
27	**Houston Natural Gas Corp.**	Houston
397	**Houston Oil & Energy Inc.**	Abilene, TX
130	**Houston Oil Trust**	Houston
125	**Howell Corp.**	Houston
346	**Hubco Exploration Inc.**	Lafayette, LA
157	**IMC Exploration Co.**	Houston
129	**INDREX Quarles Drilling**	Tulsa
361	**Impact Energy Inc.**	Denver
395	**Imperial Energy Corp.**	Denver
74	**Inexco Oil Co.**	Houston
17	**InterNorth Inc.**	Omaha, NE
288	**Intercontinental Energy Corp.**	Englewood, CO
375	**International Royalty & Oil Co.**	Cisco, TX
322	**Intramerican Oil & Minerals, Inc.**	Dallas
290	**JM Resources Inc.**	Denver
209	**Jackson Exploration Inc.**	Dallas
296	**Jefferson-Williams Energy Corp.**	Dallas
93	**KN Energy Inc.**	Lakewood, CO
263	**KRM Petroleum Corp.**	Denver
114	**Kaiser Energy Inc.**	Oakland, CA
62	**Kaneb Services Inc.**	Sugar Land, TX
299	**Kee Exploration Inc.**	Gillette, WY
198	**KenCope Energy Cos.**	San Antonio
144	**Kenai Corp.**	New York
28	**Kerr-McGee Corp.**	Oklahoma City
205	**Kimbark Oil & Gas Co.**	Denver
121	**Kirby Exploration Co.**	Houston
177	**LL&E Royalty Trust**	Houston
373	**LR Co.**	Casper, WY
81	**Lear Petroleum Corp.**	Dallas
372	**Loch Exploration Inc.**	Gainesville, TX
237	**Lomak Petroleum Inc.**	Hartville, OH
52	**Louisiana Land & Exploration Co.**	New Orleans
334	**Love Oil Co. Inc.**	Denver
329	**Lyric Energy Inc.**	Amarillo, TX
110	**MCO Resources Inc.**	Houston
204	**MSR Exploration Ltd.**	Cut Bank, MT

The OGJ 400 Company Index (continued)

Rank by total assets	Company name	Headquarters city
195	**Macmillan Ring-Free Oil Co. Inc**	New York
90	**Madison Resources Inc.**	New York
170	**Magic Circle Energy Corp.**	Oklahoma City
46	**Mapco Inc.**	Tulsa
14	**Marathon Oil Co.**	Findlay, OH
137	**Marion Corp.**	Daphne, AL
313	**Marlin Oil Co.**	Denver
164	**Marline Oil Corp.**	Houston
343	**Masters Energy Corp.**	Oklahoma City
182	**May Energy Partners Ltd.**	Dallas
148	**May Petroleum Inc.**	Dallas
171	**Maynard Oil Co.**	Dallas
169	**McCormick Oil & Gas Partnership**	Houston
190	**McFarland Energy Inc.**	Santa Fe Springs, CA
316	**Melton Drilling & Exploration Co.**	Midland, TX
47	**Meridian Oil Inc.**	Houston
26	**Mesa Petroleum Co.**	Amarillo, TX
141	**Michigan Energy Resources Co.**	Monroe, MI
238	**Mid America Petroleum Inc.**	Midland, TX
32	**MidCon Corp.**	Lombard, IL
328	**Midwest Exploration Inc.**	Oklahoma City
214	**Minden Oil & Gas Inc.**	Houston
43	**Mitchell Energy & Development Corp.**	The Woodlands, TX
2	**Mobil Corp.**	New York
244	**Monogram Oil & Gas Inc.**	North Canton, OH
87	**Monsanto Oil Co.**	Houston
69	**Montana Dakota Utilities Co.**	Bismarck, ND
48	**Montana Power Co.**	Butte, MT
133	**Moore McCormack Energy**	Dallas
384	**Mountain States Resources Corp.**	Midvale, UT
39	**Murphy Oil Corp.**	El Dorado, AR
311	**Mustang Drilling & Exploration Inc.**	Great Bend, KS
333	**NP Energy Corp.**	Los Angeles
112	**NUI Corp.**	Bridgewater, NJ
297	**Nahama & Weagant Energy Co.**	Bakersfield, CA
68	**National Fuel Gas Co.**	New York
383	**Natura Energy Corp.**	Midland, TX
286	**Newhall Resources**	Valencia, CA
321	**Newport Petroleums Inc.**	Dallas
165	**Nicklos Oil & Gas Co.**	Houston
41	**Nicor Inc.**	Naperville, IN
278	**Noarko Resources Inc.**	Denver
77	**Noble Affiliates Inc.**	Ardmore, OK
252	**Norris Oil Co.**	Beverly Hills, CA
128	**Northern Michigan Exploration Co.**	Jackson, MI
260	**Nugget Oil Corp.**	Bloomington, MN
172	**OKC Limited Partnership**	Dallas
12	**Occidental Petroleum Corp.**	Los Angeles
53	**Ocean Drilling & Exploration Co.**	New Orleans
352	**Oil City Petroleum Inc.**	Tulsa
61	**Oneok Inc.**	Tulsa
289	**Oregon Natural Gas Development Co.**	Portland, OR
356	**Oxford Exploration Co.**	Denver
122	**Oxoco Inc.**	Houston
377	**PETX Petroleum Corp.**	Denver
23	**Pacific Lighting Corp.**	Los Angeles
285	**Pangea Petroleum Co.**	Torrance, CA
20	**Panhandle Eastern Corp.**	Houston
305	**Panhandle Royalty Co.**	Oklahoma City
318	**Parallel Petroleum Corp.**	Midland, TX
127	**Park-Ohio Industries Inc.**	Cleveland
201	**Partners Oil Co.**	Houston
284	**Pathfinder Petroleum Corp.**	Oklahoma City
194	**Patrick Petroleum Co.**	Jackson, MI
166	**Pauley Petroleum Inc.**	Los Angeles
116	**Pelto Oil Co.**	Houston
154	**Pend Orielle Oil & Gas Co.**	Houston
277	**Peninsula Resources Corp.**	Corpus Christi, TX
36	**Pennzoil Co.**	Houston
265	**Permian Basin Royalty Trust**	Fort Worth
326	**Petra Resources Inc.**	Oklahoma City
65	**Petro-Lewis Corp.**	Denver
215	**Petroleum Development Corp.**	Bridgeport, WV
212	**Petroleum Investments Ltd**	Oklahoma City
400	**Petroleum Land Corp.**	Encino, CA
235	**Petrominerals Corp.**	Stanton, CA
210	**Petrotech Inc.**	St. Clair, MI
10	**Phillips Petroleum Co.**	Bartlesville, OK
71	**Pioneer Corp.**	Amarillo, TX
385	**Pioneer Oil & Gas Corp.**	Midvale, UT
200	**Plains Resources Inc.**	Oklahoma City
350	**Plano Petroleum Corp.**	Plano, TX
67	**Pogo Producing Co.**	Houston
123	**Prairie Producing Co.**	Houston
239	**Premier Resources Ltd.**	Denver
202	**Presidio Oil Co.**	Denver
312	**Prima Energy Corp.**	Denver
55	**Primark Corp.**	McLean, VA
106	**Primary Fuels Inc.**	Houston
261	**Pyramid Oil Co.**	Santa Fe Springs, CA
139	**Pyro Energy Corp.**	Evansville, IN
310	**QED Exploration Inc.**	Denver
88	**Quaker State Oil Refining Corp.**	Oil City, PA
63	**Questar Corp.**	Salt Lake City
245	**Ratex Resources Inc.**	Oklahoma City
59	**Reading & Bates Corp.**	Tulsa
330	**Reef Energy Corp.**	Traverse City, MI
325	**Regal Petroleum Ltd**	Denver
267	**Reichhold Energy Corp.**	Tacoma, WA
348	**Reserve Exploration Co.**	Tulsa
251	**Resource Exploration Inc**	Canton, OH
324	**Ridgeway EXCO Inc.**	Houston
336	**Roberts Oil & Gas Inc.**	Houston
203	**Rocky Mountain Natural Gas Co. Inc.**	Denver
386	**Roseland Oil & Gas Inc.**	Tyler, TX
211	**Royal Resources Corp.**	Denver
167	**SPG Exploration Corp.**	San Antonio
103	**Sabine Corp.**	Dallas
240	**Sabine Royalty Trust**	Dallas
249	**Sage Drilling Co. Inc.**	Wichita
135	**Sage Energy Co.**	San Antonio
153	**San Juan Basin Royalty Trust**	Fort Worth
60	**Santa Fe Energy Co.**	Houston
191	**Saxon Oil Co.**	Dallas
387	**Score Exploration Corp.**	Casper, WY
163	**Seagull Energy Corp.**	Houston
264	**Seahawk Oil International Inc.**	Newport Beach, CA
339	**Search Natural Resources Inc.**	Denver
262	**Seaxe Energy Corp.**	Jackson, MS
223	**Shanley Oil Co.**	Dallas
376	**Sharon Energy Ltd.**	Englewood, CO
380	**Shaw Resources Inc.**	Riverside, CA
6	**Shell Oil Co.**	Houston
192	**Snyder Oil Partners**	Fort Worth
30	**Sonat Inc.**	Birmingham, AL
294	**South Texas Drilling & Exploration Inc.**	San Antonio
353	**Southern Mineral Corp.**	Chicago
80	**Southern Union Co.**	Dallas
246	**Southland Energy Corp.**	Tulsa
85	**Southland Royalty Co.**	Fort Worth
117	**Southwestern Energy Co.**	Fayetteville, AR
323	**Sparkman Producing Co.**	Fort Worth
9	**Standard Oil Co. (Ohio)**	Cleveland
338	**States Exploration Ltd.**	Denver
199	**Statex Petroleum Inc.**	Irving, TX
234	**Strata Corp.**	Columbus, OH
276	**Striker Petroleum Corp.**	Englewood, CO
221	**Summit Energy Inc.**	Dallas
11	**Sun Co.**	Radnor PA
360	**Sunbelt Exploration Inc.**	Fort Worth
268	**Swift Energy Co.**	Houston
392	**TPEX Exploration Inc.**	Golden, CO
131	**Templeton Energy Inc.**	Houston
8	**Tenneco Inc.**	Houston
58	**Tesoro Petroleum Corp.**	San Antonio
5	**Texaco Inc.**	White Plains, NY
126	**Texas American Energy Corp.**	Midland, TX
18	**Texas Eastern Corp.**	Houston
222	**Texas Energies Inc.**	Pratt, KS
84	**Texas Gas Exploration Corp.**	Houston
107	**Texas International Co.**	Oklahoma City
33	**Texas Oil & Gas Corp.**	Dallas
367	**Texoil Inc.**	Jacksboro, TX
281	**Thor Energy Resources**	Tyler, TX
363	**Tide West Oil Co.**	Denver
79	**Tidewater Inc.**	New Orleans
146	**Tipperary Corp.**	Midland, TX
354	**Toklan Oil Corp.**	Tulsa
108	**Tom Brown Inc.**	Midland, TX
83	**Tosco Corp.**	Santa Monica, CA
64	**Total Petroleum (North America) Ltd.**	Denver
176	**Towner Petroleum Co.**	Houston
369	**Trans Atlantic Resource Corp.**	Tulsa
29	**Transco Energy Co.**	Houston
57	**Transco Exploration Partners Ltd.**	Houston
232	**Transcontinental Energy Corp.**	Shreveport, LA
335	**Transierra Exploration Co.**	Irvine, CA
378	**TriValley Oil & Gas Corp.**	Denver
140	**Tricentrol PLC**	London, England
399	**Trinity Oil & Gas Inc.**	Denver
179	**Trinity Resources Ltd.**	Houston
143	**Triton Energy Corp.**	Dallas
213	**Tucker Drilling Co. Inc.**	San Angelo, TX
332	**Tyrex Oil Co.**	Casper, WY
70	**Unimar Corp.**	Mt. Kisco, NY
38	**Union Texas Petroleum Co.**	Houston
159	**Unit Drilling & Exploration Co.**	Tulsa
40	**United Energy Resources Inc.**	Houston
357	**Universal Fuels Co.**	Denver
120	**Universal Resources Corp.**	Dallas
13	**Unocal Corp.**	Los Angeles
319	**Usenco Inc.**	Midland, TX
42	**Valero Energy Corp.**	San Antonio
236	**Valex Petroleum Inc.**	Denver
271	**Vermillion Bay Land Co.**	Lafayette, LA
138	**Wainoco Oil Corp.**	Houston
342	**Wentex International Inc.**	Garden Grove, CA
228	**Western Energy Development Co. Inc.**	Monument, CO
358	**Western Natural Gas Co.**	La Jolla, CA
293	**Whiting Petroleum Corp.**	Denver
231	**Wichita Industries Inc.**	Denver
365	**Wicklund Petroleum Corp.**	Oklahoma City
94	**Wicor Inc.**	Milwaukee, WI
22	**Williams Cos.**	Tulsa
175	**Wilshire Oil Co. of Texas**	Jersey City, NJ
155	**Wiser Oil Co.**	Sisterville, WV
197	**Witco Chemical Corp.**	New York
113	**Woods Petroleum Corp.**	Oklahoma City
145	**Worldwide Pacific Corp.**	Torrance, CA
382	**Wyoming Oil & Minerals Co.**	Casper, WY
92	**Yankee Companies Inc.**	Cohasset, MA
56	**Zapata Corp.**	Houston

CRUDE OIL ASSAYS

Key to the assays . . .

Each assay is headed, in the following order, by the official name of the crude, the former or secondary name in parenthesis, the country of origin, and location and type loading facilities. Loading systems that frequently crop up are abbreviated. Those used are CBM (conventional buoy mooring), SPM (single point mooring), SBM (single buoy mooring), CALM (catenary anchor leg mooring), and SALM (single anchor leg mooring).

Mideast

Aboozar (Ardeshir), Iran

Terminal Kharg Island

Crude
Gravity, °API: 26.9
Sulfur, wt %: 2.48
Rvp, psi: 5.5
H_2S (dissolved) wt %: 0.031
H_2S (evolved) wt %: 0.089
Pour pt., °F.: −30
Salt, lb/1,000 bbl: 55.0
Neutralization value, mg KOH/g: 1.96
Rams. carbon, wt %: 5.9
Kin. vis., cSt @ 68° F.: 36.58
@ 122° F.: 12.76
V/Ni, ppm: 71/21
Light hydrocarbons, vol %: 3.86

Naphtha
Range (TBP), °F.: C_5-200
Yield, vol %: 5.5
Gravity, °API: 80.2
Sulfur (total) wt %: 0.090
Mercaptan S, wt %: 0.044
Rvp, psi: 10.3
Paraffins, vol %: 72.6
Naphthenes, vol %: 24.2
Aromatics, vol %: 3.1
RON, clear: 71.7
MON, clear: 67.9

Naphtha
Range (TBP), °F.: 200-320
Yield, vol %: 8.4
Gravity, °API: 55.7
Sulfur (total) wt %: 0.097
Mercaptan S, wt %: 0.027
Rvp, psi: 1.0
P/N/A, vol %: 60.1/27.3/12.7
RON, clear: 45.7
MON, clear: 44.3

Naphtha
Range (TBP), °F.: 320-360
Yield, vol %: 3.8
Gravity, °API: 48.6
Sulfur (total), wt %: 0.158
Mercaptan S, wt %: 0.023
P/N/A, vol %: 59.1/25.8/15.1
RON, clear: 30.2
MON, clear: 31.4

Kerosine
Range (TBP), °F.: 360-520
Yield, vol %: 14.4
Gravity, °API: 41.9
Sulfur (total), wt %: 0.452
Mercaptan S, wt %: 0.015
Aniline pt., °F.: 143.9
Diesel index: 60.2
Cetane index: 49.3
Freeze pt., °F.: −32
Cloud pt., °F.: −49
Pour pt., °F.: −52
Smoke pt., mm: 20

Gas oil
Range (TBP), °F.: 520-650
Yield, vol %: 12.7
Gravity, °API: 33.4
Sulfur (total), wt %: 1.274
Charac. factor: 11.74
Aniline pt., °F.: 158.8
Diesel index: 53.0
Cetane index: 52.7
Cloud pt., °F.: 21
Pour pt., °F.: 18
Vis., SUS @ 100° F.: 40.4
@ 122° F.: 37.1

Residuum
Range (TBP), °F.: 650 +
Yield, vol %: 53.5
Gravity, °API: 12.5
Sulfur (total), wt %: 3.804
Pour pt., °F.: 56
Rams. carbon, wt %: 10.0
Vis., SUS @ 122° F.: 12,303.9
@ 210° F.: 465.9
V/Ni, ppm: 120/36

Residuum
Range (TBP), °F.: 1,050 +
Yield, vol %: 24.2
Gravity, °API: 3.5
Sulfur (total), wt %: 5.069
Pour pt., °F.: 210
Rams. carbon, wt %: 19.6
Vis., SUS @ 210° F.: 125,012.7
V/Ni, ppm: 244/74

Abu Al Bu Khoosh, Abu Dhabi, U.A.E.

Storage tanker offshore producing area

Crude
Gravity, °API: 31.6
Sulfur, wt %: 2.0
Pour pt., °C.: −12 (−24.5° F.)
Kin. vis., 37.8° C. cSt: 6.7
Con. carbon, wt %: 4.3
Rvp, psi: 3.5
V/Ni, ppm: 12/7
Ibp-15° C. yield, wt %: 0.59
vol %: 0.69

Light naphtha
Range, °C.: 15-65
Yield, wt %: 2.74
vol %: 3.59
Gravity, °API: 88.7
Sulfur, wt %: 0.03
Mercaptans, ppm: 325
Paraffins, vol %: 95
Naphthenes, vol %: 4.4
Aromatics, vol %: 0.06
RON, clear: 74
RON + 3 ml TEL: 94.5

Heavy naphtha
Range, °C.: 65-165
Yield, wt %: 14.45
vol %: 16.83
Gravity, °API: 59.6
Sulfur, wt %: 0.05
Mercaptans, ppm: 276
P/N/A, vol %: 68.3/18.5/13.2

Kerosine
Range, °C.: 165-230
Yield, wt %: 11.52
vol %: 12.53
Gravity, °API: 46.25
Sulfur, wt %: 0.16
Mercaptans, ppm: 182
P/N/A, vol %: 55.5/21.8/22.7
Freezing pt., °C.: −52.5
Aniline pt., °C.: 56.4
Diesel index: 61.7
Smoke pt., mm: 23

Light gas oil
Range, °C.: 230-300
Yield, wt %: 12.5
vol %: 12.96
Gravity, °API: 37.6
Sulfur, wt %: 0.85
Pour pt., °C.: −27
Cloud pt., °C.: −19
Aniline pt., °C.: 65
Diesel index: 55.9
Kin. vis., cSt @ 37.8° C.: 2.63

Heavy gas oil
Range, °C.: 300-375
Yield, wt %: 13.83
vol %: 12.71
Gravity, °API: 30.3
Sulfur, wt %: 1.9
Pour pt., °C.: +2
Cloud pt., °C.: +7
Aniline pt., °C.: 72.2
Diesel index: 49.1
Kin. vis., cSt @ 37.8° C.: 6.92

Distillate
Range, °C.: 375-550
Yield, wt %: 26.63
vol %: 24.95
Gravity, °API: 21.4

Sulfur, wt %: 2.67
Pour pt, °C.: +26
Cloud pt, °C.: +28
Con. carbon, wt %: 0.7
Kin. vis., cSt @ 50° C.: 40.96
@ 98.9° C.: 7.89

Residue
Range, °C.: 375+
Yield, wt %: 45.37
vol %: 40.69
Gravity, °API: 14.9
Sulfur, wt %: 3.4
Pour pt, °C.: +21
Asphaltenes, wt %: 3.1
V/Ni, ppm: 30/14
Kin. vis., cSt @ 50° C.: 435
@ 98.9° C.: 40.3

Residue
Range, °C.: 550+
Yield, wt %: 18.7
vol %: 15.7
Gravity, °API: 4.3
Sulfur, wt %: 4.4
Pour pt, °C.: +50
Asphaltenes, wt %: 9.2
V/Ni, ppm: 67/35
Kin. vis., cSt @ 98.9° C.: 1.860
Pen. at 25° C.: 125

Arabian Heavy (Safaniya), Saudi Arabia

Ras Tanura

Crude
Gravity, °API: 27.9
Sulfur, wt %: 2.85
Pour pt, °F.: −20
Rvp, psi: 7.5
Kin. vis., cSt @ 70° F.: 37.0
@ 100° F.: 19.0

Light naphtha
Range, °FVT: 68-212
Yield, vol %: 7.9
Gravity, °API: 79.9
Sulfur, wt %: 0.0059
Rvp, psi: 8.5
Paraffins, vol %: 88.6
Naphthenes, vol %: 10.2
Aromatics, vol %: 1.2
RON, clear: 58.0

Heavy naphtha
Range, °FVT: 212-302
Yield, vol %: 6.8
Gravity, °API: 60.5
Sulfur, wt %: 0.016
P/N/A, vol %: 70.8/19.5/9.7

Kerosine
Range, °FVT: 302-455
Yield, vol %: 12.4
Gravity, °API: 48.4
Sulfur, wt % 0.16
Aromatics, vol %: 18.9
Freeze pt °F.: −67
Smoke pt, mm: 26
Luminometer no.: 57
Aniline pt, °F.: 141
Kin. vis., cSt @ −30° F.: 5.14
@ 100° F.: 1.14

Light gas oil
Range, °FVT: 455-650
Yield, vol %: 16.5
Gravity, °API: 35.2
Sulfur, wt %: 1.30
Pour pt, °F.: 5
Aniline pt, °F.: 154
Kin. vis., cSt @ 100° F.: 3.45
@ 210° F.: 1.30

Heavy gas oil
Range, °FVT: 650-1,049
Yield, vol %: 30.6
Gravity, °API: 20.9
Sulfur, wt %: 2.92
Pour pt, °F.: 95
Aniline pt, °F.: 173
Kin. vis., cSt @ 100° F.: 77.0
@ 210° F.: 8.46

Residual oil
Range, °FVT: 650+
Yield, vol %: 53.8
Gravity, °API: 12.6
Sulfur, wt %: 4.34
Pour pt, °F.: 60
Con. carbon, wt %: 13.3
Kin. vis., cSt @ 100° F.: 4,103
@ 210° F.: 94.2

Residual oil
Range, °FVT: 1,049+
Yield, vol %: 23.2
Gravity, °API: 3.0
Sulfur, wt %: 6.0
Pour pt, °F.: 120+
Con. carbon, wt %: 27.7
Kin. vis., cSt @ 210° F.: 55,292
Furol, sec @ 275° F.: 1,309
V/Ni/Fe, ppm: 205/64/30

Arabian Light, Saudi Arabia

Ras Tanura and Yanbu also Sidon, Lebanon

Crude
Gravity, °API: 33.4
Sulfur, wt %: 1.79
Pour pt, °F.: −30
Rvp, psi: 3.6
Kin. vis., cSt @ 70° F.: 10.2
@ 100° F.: 6.25

Light naphtha
Range, °FVT: 68-212
Yield, vol %: 8.9
Gravity, °API: 78.4
Sulfur, wt %: 0.024
Rvp, psi: 8.2
Paraffins, vol %: 86.8
Naphthenes, vol %: 10.7
Aromatics, vol %: 2.5
RON, clear: 55.0

Heavy naphtha
Range, °FVT: 212-302
Yield, vol %: 8.5
Gravity, °API: 59.3
Sulfur, wt %: 0.027
P/N/A, vol %: 68.3/19.0/12.7

Kerosine
Range, °FVT: 302-455
Yield, vol %: 16.5
Gravity, °API: 48.0
Sulfur, wt %: 0.084
Aromatics, vol %: 20.6
Freeze pt, °F.: −71
Smoke pt, mm: 23
Luminometer no.: 51
Aniline pt, °F.: 138
Kin. vis., cSt @ −30° F.: 5.39
@ 100° F.: 1.13

Light gas oil
Range, °FVT: 455-650
Yield, vol %: 19.7
Gravity, °API: 36.5
Sulfur, wt %: 1.03
Pour pt, °F.: 5
Aniline pt, °F.: 158
Kin. vis., cSt @ 100° F.: 3.35
@ 210° F.: 1.30

Heavy gas oil
Range, °FVT: 650-1,049
Yield, vol %: 29.8
Gravity, °API: 22.9
Sulfur, wt %: 2.41
Pour pt, °F.: 95
Aniline pt, °F.: 180
Kin. vis., cSt @ 100° F.: 55.5
@ 210° F.: 6.89

Residual oil
Range, °FVT: 650+
Yield, vol %: 44.6
Gravity, °API: 17.2
Sulfur, wt %: 3.1
Pour pt, °F.: 35
Con. carbon, wt %: 7.6
Kin. vis., cSt @ 100° F.: 414.3
@ 210° F.: 24.2

Residual oil
Range, °FVT: 1,049+
Yield, vol %: 14.8
Gravity, °API: 6.9
Sulfur, wt %: 4.34
Pour pt, °F.: 115
Con. carbon, wt %: 20.3
Kin. vis., cSt @ 210° F.: 1,589
Furol, sec @ 275° F.: 104
V/Ni/Fe, ppm: 116/25/114

Arabian Light (Berri), Saudi Arabia

Ras Tanura

Crude
Gravity, °API: 37.8
Sulfur, wt %: 1.19
Pour pt, °F.: −25
Rvp, psi: 4.0
Kin. vis., cSt @ 70° F.: 5.80
@ 100° F.: 3.86

Light Naphtha
Range, °FVT: 68-212
Yield, vol %: 10.1
Gravity, °API: 78.4
Sulfur, wt %: 0.071
Rvp, psi: 6.9
Paraffins, vol %: 87.4
Naphthenes, vol %: 11.2
Aromatics, vol %: 1.4
RON, clear: 50.0

Heavy naphtha
Range, °FVT: 212-302
Yield, vol %: 8.7
Gravity, °API: 58.2
Sulfur, wt %: 0.053
P/N/A, vol %: 65.3/20.4/14.3

Kerosine
Range, °FVT: 302-455
Yield, vol %: 18.7
Gravity, °API: 48.4
Sulfur, wt %: 0.090
Aromatics, vol %: 19.9
Freeze pt, °F.: −71
Smoke pt, mm: 25
Luminometer no.: 54
Aniline pt, °F.: 136
Kin. vis., cSt @ −30° F.: 4.79
@ 100° F.: 1.10

Light gas oil
Range, °FVT: 455-650
Yield, vol %: 21.2
Gravity, °API: 37.3
Sulfur, wt %: 0.72
Pour pt, °F.: 10
Aniline pt, °F.: 161
Kin. vis., cSt @ 100° F.: 3.4
@ 210° F.: 1.28

Heavy gas oil
Range, °FVT: 650-1,049
Yield, vol %: 30.3
Gravity, °API: 25.1
Sulfur, wt %: 1.83
Pour pt, °F.: 95
Aniline pt, °F.: 192
Kin. vis., cSt @ 100° F.: 44.4
@ 210° F.: 6.25

Residual oil
Range, °FVT: 650+
Yield, vol %: 39.3
Gravity, °API: 21.6
Sulfur, wt %: 2.09
Pour pt, °F.: 70
Con. carbon, wt %: 4.2
Kin. vis., cSt @ 100° F.: 128.1
@ 210° F.: 12.34

Residual oil
Range, °FVT: 1,049+
Yield, vol %: 9.0
Gravity, °API: 11.0
Sulfur, wt %: 2.88
Pour pt, °F.: 80
Con. carbon, wt %: 16.2
Kin. vis., cSt @ 210° F.: 396.9
Furol, sec @ 275° F.: 38.2
V/Ni, ppm: 9/6
Aromatics, ppm: 46

Arabian Medium (Khursaniyah), Saudi Arabia

Ras Tanura

Crude
Gravity, °API: 30.8
Sulfur, wt %: 2.40
Pour pt, °F.: +5
Rvp, psi: 3.2
Kin. vis., cSt @ 70° F.: 16.2
@ 100° F.: 9.41

Light naphtha
Range, °FVT: 68-212
Yield, vol %: 8.9
Gravity, °API: 77.7
Sulfur, wt %: 0.043
Rvp, psi: 7.9
Paraffins, vol %: 85.3
Naphthenes, vol %: 12.3
Aromatics, vol %: 2.4
RON, clear: 54.5

Heavy naphtha
Range, °FVT: 212-302
Yield, vol %: 7.7
Gravity, °API: 59.1
Sulfur, wt %: 0.050
P/N/A, vol %: 68.5/18.8/12.7

Kerosine
Range, °FVT: 302-455
Yield, vol %: 14.5
Gravity, °API: 48.0
Sulfur, wt %: 0.14
Aromatics, vol %: 20.6
Freeze pt, °F.: -62
Smoke pt, mm: 23
Luminometer no.: 52
Aniline pt, °F.: 136
Kin. vis., cSt @ -30° F.: 5.10
@ 100° F.: 1.13

Light gas oil
Range, °FVT: 455-650
Yield, vol %: 18.1
Gravity, °API: 36.0
Sulfur, wt %: 1.24
Pour pt, °F.: 15
Aniline pt, °F.: 157
Kin. vis., cSt @ 100° F.: 3.53
@ 210° F.: 1.32

Heavy gas oil
Range, °FVT: 650-1,049
Yield, vol %: 30.9
Gravity, °API: 21.9
Sulfur, wt %: 2.91
Pour pt, °F.: 100
Aniline pt, °F.: 176
Kin. vis., cSt @ 100° F.: 49.2
@ 210° F.: 6.40

Residual oil
Range, °FVT: 650+
Yield, vol %: 49.6
Gravity, °API: 15.0
Sulfur, wt %: 3.90
Pour pt, °F.: 55
Con. carbon, wt %: 9.9
Kin. vis., cSt @ 100° F.: 850
@ 210° F.: 36.0

Residual oil
Range, °FVT: 1,049+
Yield, vol %: 18.7
Gravity, °API: 4.9
Sulfur, wt %: 5.35
Pour pt, ° F.: 115
Con. carbon, wt %: 23.3
Kin. vis., cSt @ 210° F.: 3,847
Furol, sec @ 275° F.: 226
V/Ni/Fe, ppm: 96/32/30

Arabian Medium (Zuluf/Marjan), Saudi Arabia

Juayma

Crude
Gravity, °API: 31.1
Sulfur, wt %: 2.48
Pour pt, °F.: -20
Rvp, psi: 8.3
Kin. vis., cSt @ 70° F.: 19.4
@ 100° F.: 11.01

Light naphtha
Range, °FVT: 68-212
Yield, vol %: 8.9
Gravity, °API: 79.7
Sulfur, wt %: 0.0069
Rvp, psi: 9.1
Paraffins, vol %: 89.3
Naphthenes, vol %: 9.6
Aromatics, vol %: 1.1
RON, clear: 58.6

Heavy naphtha
Range, °FVT: 212-302
Yield, vol % on crude: 8.2
Gravity, °API: 60.2
Sulfur, wt %: 0.024
P/N/A, vol %: 69.3/20.2/10.5

Kerosine
Range, °FVT: 302-455
Yield, vol %: 14.1
Gravity, °API: 48.3
Sulfur, wt %: 0.14
Aromatics, vol %: 17.2
Freeze pt, °F.: -72
Smoke pt, mm: 26
Luminometer no.: 59
Aniline pt, °F.: 139
Kin. vis., cSt @ -30° F.: 5.01
@ 100° F.: 1.13

Light gas oil
Range, °FVT: 455-650
Yield, vol %: 17.6
Gravity, °API: 36.1
Sulfur, wt %: 1.25
Pour pt, °F.: 10
Aniline pt, °F.: 158
Kin. vis., cSt @ 100° F.: 3.45
@ 210° F.: 1.31

Heavy gas oil
Range, °FVT: 650-1,049
Yield, vol %: 28.2
Gravity, °API: 21.8
Sulfur, wt %: 2.90
Pour pt, °F.: 95
Aniline pt, °F.: 177
Kin. vis., cSt @ 100° F.: 72.6
@ 210° F.: 8.04

Residual oil
Range, °FVT: 650+
Yield, vol %: 48.0
Gravity, °API: 13.9
Sulfur, wt %: 4.06
Pour pt, ° F.: 55
Con. carbon, wt %: 9.4
Kin. vis., cSt @ 100° F.: 2,126
@ 210° F.: 65.9

Residual oil
Range, °FVT: 1,049+
Yield, vol %: 19.8
Gravity, °API: 3.9
Sulfur, wt %: 5.51
Pour pt, ° F.: 140
Con. carbon, wt %: 20.5
Kin. vis., cSt @ 210° F.: 20,085
Furol, sec @ 275° F.: 684
V/Ni/Fe, ppm: 179/54/40

Bahrgansar/Nowruz (SIRIP Blend), Iran

Ras Bahrgan SBM

Crude
Gravity, °API: 27.1
Sulfur, wt %: 2.45
Pour pt, °C.: -33
Vis., cSt @ 100° F.: 20.4
Con. carbon, wt %: 7.9
Rvp, kg/sq cm: 0.56
Salt, lb/1,000 bbl: 30.6
V/Ni, ppm: 72/25

Light naphtha
Range, °C.: C_5-66
Yield, wt %: 3.76
Gravity, °API: 84.3
Sulfur, wt %: 0.065
Rvp, kg/sq cm: 0.87
Paraffins, vol %: 92.3
Naphthenes, vol %: 6.3
Aromatics, vol %: 1.4
RON, clear: 67.4

Heavy naphtha
Range, °C.: 66-150
Yield, wt %: 8.59
Gravity, °API: 59.6
Sulfur, wt %: 0.06
P/N/A, vol %: 60.0/31.0/9.0
RON, clear: 48.0

Kerosine
Range, °C.: 150-250
Yield, wt %: 13.23
Gravity, °API: 46.0
Sulfur, wt %: 0.228
Aromatics, vol %: 18.5
Freezing pt, °C.: < -55
Smoke pt, mm: 22
Aniline pt, °C.: 59.8

Gas oil
Range, °C.: 250-350
Yield, wt %: 14.04
Gravity, °API: 33.6
Sulfur, wt %: 1.19
Pour pt, °C.: -12
Aniline pt, °C.: 69.2
Diesel index: 53.0

Residual oil
Range, °C.: 350+
Yield, wt %: 59.00
Gravity, °API: 11.3
Sulfur, wt %: 3.8
Pour pt, °C.: +12
Con. carbon, wt %: 13.35

Residual oil
Range, °C.: 550+
Yield, wt %: 35.90
Gravity, °API: 4.4
Sulfur, wt %: 4.84
Pour pt, °C.: < +48
Con. carbon, wt %: 21.85
V/Ni/Fe, ppm: 202/69/52

Note: Same assay first published in 1976.

Basrah Heavy, Iraq

Mina al Bakr sea terminal in Persian Gulf (Khor al Khafja)

Crude
Gravity, °API: 24.7
Sulfur, wt %: 3.5
Pour pt, °C.: -30
Kin. vis. @ 10° C., cSt: 86.3
C$_4$ & lighter, wt %: 0.8

Light SR naphtha
Range, °C.: C$_5$-65
Yield, wt %: 2.6
Density @ 15° C., g/cu m: 0.648
RON + 0.4 g Pb/l: 83

Heavy SR naphtha
Range, °C.: 65-175
Yield, wt %: 12.2
Density @ 15° C., g/cu m: 0.74
RON + 0.4 g Pb/l: 55
Aromatics, vol %: 9.5
Naphthenes, vol %: 21

Kerosine
Range, °C.: 175-222
Yield, wt %: 6.9
Density @ 15° C., g/cu m: 0.799
Sulfur, wt %: 0.38

Gas oil
Range, °C.: 225-360
Yield, wt %: 21.6
Density @ 15° C., g/cu m: 0.871
Sulfur, wt %: 1.95
Pour pt, °C.: -16
Cold filter pour pt, °C.: -14
Kin. vis., cSt @ 100° C.: 1.42

Heavy gas oil
Range, °C.: 360-460
Yield, wt %: 13.5
Density @ 15° C., g/cu m: 0.935
Sulfur, wt %: 3.57
Kin. vis., cSt @ 100° C.: 5.20

Long residuum
Range, °C.: 360+
Yield, wt %: 55.9
Density @ 15° C., g/cu m: 1.012
Sulfur, wt %: 5.25
Kin. vis., cSt @ 100° C.: 178.2

Short residuum
Range, °C.: 460+
Yield, wt %: 42.4
Density @ 15° C., g/cu m: 1.041
Sulfur, wt %: 5.80
Kin. vis., cSt @ 100° C.: 1,350
Con. carbon, wt %: 22.0
V/Ni, ppm: 212/26
Pen. @ 25° C., 0.1 mm: 180

Basrah Light, Iraq

Marine pipeline to Khor-al-Amaya piled structure in gulf

Crude
Gravity, °API: 33.7
Sulfur, wt %: 1.95
Pour pt, °C.: -15
Kin. vis., cSt @ 10° C.: 15.0
C$_4$ & lighter, wt %: 1.3

Light SR naphtha
Range, °C.: C$_5$-65
Yield, wt %: 3.7
Density @ 15° C., g/cu m: 0.646
RON + 0.4 g Pb/1: 83

Heavy SR naphtha
Range, °C.: 65-175
Yield, wt %: 16.2
Density @ 15° C., g/cu m: 0.737
RON + 0.4 g Pb/1: 54
Aromatics, vol %: 10
Naphthenes, vol %: 17

Kerosine
Range, °C.: 175-225
Yield, wt %: 8.2
Density @ 15° C., g/cu m: 0.795
Sulfur, wt %: 0.10

Gas oil
Range, °C.: 225-360
Yield, wt %: 22.9
Density @ 15° C., g/cu m: 0.843
Sulfur, wt %: 1.20
Pour pt, °C.: -12
CFPP, °C.: -9
Kin. vis., cSt @ 100° C.: 1.35

Heavy gas oil
Range, °C.: 360-525
Yield, wt %: 25.1
Density @ 15° C., g/cu m: 0.916
Sulfur, wt %: 2.41
Kin. vis., cSt @ 100° C.: 8.00

Long residuum
Range, °C.: 360+
Yield, wt %: 47.7
Density @ 15° C., g/cu m: 0.966
Sulfur, wt %: 3.60
Kin. vis., cSt @ 100° C.: 38.5

Short residuum
Range, °C.: 525+
Yield, wt %: 22.6
Density @ 15° C., g/cu m: 1.020
Sulfur, wt %: 4.70
Kin. vis., cSt @ 100° C.: 760
Con. carbon, wt %: 18.5
V/Ni, ppm: 80/22

Basrah Medium, Iraq

Mina-al-Bakr sea terminal in Persian Gulf (Khor al Khafja)

Crude
Gravity, °API: 31.1
Sulfur, wt %: 2.58
Pour pt, °C.: -30
Kin. vis., cSt @ 10° C.: 41.0
C$_4$ & lighter, wt %: 1.6

Light SR naphtha
Range, °C.: C$_5$-65
Yield, wt %: 3.3
Density, 15° C., g/cu m: 0.64
RON + 0.4, g Pb/l: 80

Heavy SR naphtha
Range, °C.: 65-175
Yield, wt %: 14.9
Density @ 15° C., g/cu m: 0.736
RON + 0.4 g Pb/l: 54
Aromatics, vol %: 10.0
Naphthenes, vol %: 17

Kerosine
Range, °C.: 175-225
Yield, wt %: 7.5
Density @ 15° C., g/cu m: 0.793
Sulfur, wt %: 0.23

Gas oil
Range, °C.: 225-360
Yield, wt %: 22.3
Density @ 15° C., g/cu m: 0.849
Sulfur, wt %: 1.57
Pour pt, °C.: -13
CFPP, °C.: -10
[illegible] vis., cSt @ 100° C.: 1.44

[illegible] gas oil
Range, °C.: 360-520
Yield, wt %: 21.9
Density @ 15° C., g/cu m: 0.931
Sulfur, wt %: 3.08
Kin. vis., cSt @ 100° C.: 8.74

Long residuum
Range, °C.: 360+
Yield, wt %: 50.4
Density @ 15° C., g/cu m: 0.984
Sulfur, wt %: 4.38
Kin. vis., cSt @ 100° C.: 61.7

Short residuum
Range, °C.: 520+
Yield, wt %: 28.5
Density @ 15° C., g/cu m: 1.032
Sulfur, wt %: 5.43
Kin. vis., cSt @ 100° C.: 1,400
Con. carbon, wt %: 19.0
V/Ni, ppm: 175/63
Pen. @ 25° C., 0.1 mm: 180

Belayim, Egypt

Wadi el Feiran, Gulf of Suez

Crude
Gravity, °API: 27.5
Sulfur, wt %: 2.20
Vis., cSt @ 20° C.: 51.27
Pour pt, °C.: +6
Wax content, wt %: 8.0
Rvp, psi: 6.50
Carbon residue, wt %: 7.25
V/Ni, ppm: 79.4/54.6
C$_1$-C$_4$, yield, vol %: 2.43

Naphtha
Range, °C.: C$_5$-82
Yield, vol %: 5.12
RON, clear: 67.0
Ron + 0.4 Pb/l: 80.8

Naphtha
Range, °C.: 82-160
Yield, vol %: 10.15
Paraffins, vol %: 57.0
Napthenes, vol %: 33.0
Aromatics, vol %: 10.0
RON, clear: 47.2

Kerosine
Range, °C.: 160-230
Yield, vol %: 9.36
Gravity, °API: 45.4
Total sulfur, wt %: 0.36
Smoke pt, mm: 24
Aromatics, vol %: 16.7

Gas oil
Range, °C.: 230-350
Yield, vol %: 18.49
Gravity, °API: 34.0
Total sulfur, wt %: 1.47
Vis., cSt @ 20° C.: 6.532
Pour pt, °C: -7
Aniline pt, °C.: 69.2
Diesel index: 53.2

Vacuum distillate
Range, °C.: 350-550
Yield, vol %: 26.94
Gravity, °API: 23.2
Total sulfur, wt %: 2.19
Vis., cSt @ 50° C.: 36.24
Pour pt, °C.: +39
Carbon residue, wt %: 0.65
Basic N, ppm: 540
Total N, ppm: 1,813

Residue
Range, °C.: 350+
Yield, vol %: 54.45
Gravity, °API: 13.5
Total sulfur, wt %: 3.12
Vis., cSt @ 50° C.: 1,508
Pour pt, °C.: +30
Wax content, wt %: 13.7
Carbon residue, wt %: 12.10
V/Ni, ppm: 133.1/91.5

Burgan (Wafra), Divided Zone

Mina Saud, Divided Zone CBM, also Mina Abdulla, Kuwait

Crude
Gravity, °API: 23.3
Sulfur, wt %: 3.37
Pour pt, °F.: −5
Vis., Saybolt @ 122° F.: 134
Con. carbon, wt %: 7.7
Rvp, psi: 3.4
Salt content, lb/1,000 bbl: 17.5
V/Ni, ppm: 34/6.8

Light naphtha
Range, °F.: IBP-200
Yield, vol %: 3.20
Gravity, °API: 77.5
Sulfur, wt %: 0.01
Rvp, psi: 9.6
Paraffins, vol %: 74
Naphthenes, vol %: 25
Aromatics, vol %: 1
RON, clear: 73.1

Heavy naphtha
Range, °F.: 200-435
Yield, vol %: 13.62
Gravity, °API: 49.8
Sulfur, wt %: 0.15
Rvp, psi: 0.2
P/N/A, vol %: 44/36/20
RON, clear: 52.0
RON, + 3 g TEL: 68.0

Kerosine
Range, °F.: 435-500
Yield, vol %: 6.70
Gravity, °API: 38.5
Sulfur, wt %: 0.76
Aromatics, vol %: 37
Freezing pt, °F.: −47
Smoke pt, mm: 18
Aniline pt, °F.: 137.7
Cetane index: 47.3
ASTM, 50% pt, °F.: 456

Gas oil
Range, °F.: 500-620
Yield, vol %: 12.63
Gravity, °API: 32.7
Sulfur, wt %: 1.76
Pour pt, °F.: −5
Aniline pt, °F.: 153.3
Cetane index: 52.0

Residual oil
Range, °F.: 620+
Yield, vol %: 63.45
Gravity, °API: 13.2
Sulfur, wt %: 4.45
Pour pt, °F.: +60
Con. carbon, wt %: 1.5

Residual oil
Range, °F.: 1,048+
Yield, vol %: 34.23
Gravity, °API: 6.2
Sulfur, wt %: 5.43
Con. carbon, wt %: 20.3
V/Ni, ppm: 120/25

Dorrood (Darius), Iran

Kharg Island

Crude
Gravity, °API: 33.6
Sulfur, wt %: 2.35
Rvp, psi: 6.5
H_2S (evolved), wt %: 0.026
Pour pt, °F.: −4.5
Rams. carbon, wt %: 4.6
Kin. vis., cSt @ 100° F.: 5.65
V/Ni, ppm: 23/8
C_1-C_5, vol %: 6.35

Naphtha
Range (TBP), °F.: C_5-200
Yield, vol %: 10.1
Gravity, °API: 81.9
Sulfur, wt %: 0.067
Charac. factor: 12.70
Paraffins, vol %: 85.6
Naphthenes, vol %: 12.2
Aromatics, vol %: 2.2
RON/MON, clear: 61.7/61.1

Naphtha
Range (TBP), °F.: 200-320
Yield, vol %: 12.7
Gravity, °API: 59.0
Sulfur, wt %: 0.088
Charac. factor: 12.07
P/N/A, vol %: 67.5/17.8/14.8
RON/MON, clear: 33.0/ 35.9

Kerosine
Range, °F.: 320-520
Yield, vol %: 18.6
Gravity, °API: 44.9
Sulfur, wt %: 0.462
Charac. factor: 11.88
Aniline pt, °F.: 142.9
Diesel index: 64.1
Cetane index: 46.3
Freeze pt, °F.: −41
Cloud pt, °F.: −44
Pour pt, °F.: −49
Smoke pt, mm: 24
Naphthalenes, vol %: 2.66
Neut. no., mg Koh/g: 0.20
Vis., SUS @ 68° F.: 32.7

Gas oil
Range, °F.: 520-650
Yield, vol %: 11.5
Gravity, °API: 33.7
Sulfur, wt %: 1.68
Charac. factor: 11.76
Aniline pt, °F.: 162.3
Diesel index: 54.6
Cetane index: 49.9
Cloud pt, °F.: 26
Pour pt, °F.: 21
Vis., SUS @ 68° F.: 47.0

Residuum
Range, °F.: 650+
Yield, vol %: 44.6
Gravity, °API: 14.5
Sulfur, wt %: 3.97
Pour pt: °F.: 58
Rams. carbon, wt %: 9.10
Vis., SUS @ 122° F.: 1,494.0
V/Ni, ppm: 45/16

Residuum
Range, °F.: 1,050+
Yield, vol %: 17.9
Gravity, °API: 3.8
Sulfur, wt %: 5.38
Pour pt, °F.: 141
V/Ni, ppm: 101/36

Dubai (Fateh), Dubai, U.A.E.

SBMs in offshore Persian Gulf producing area

Crude
Gravity, °API: 31.05
Total sulfur, wt %: 2.0
Kin. vis., cSt @ 20° C.: 12.82
@ 40° C.: 7.05
Rvp, bar: 0.419
Pour pt, °C.: −9
Asphaltenes, wt %: 1.70
Con. carbon, wt %: 4.62
V/Ni, ppm: 42/14

Debutanized naphtha
Range, °C.: 15-145
Yield, vol %: 16.4
Gravity °API: 75.0
Vol % position in crude: 2.0-18.4
Total sulfur, ppm: 193
Rvp, bar: 0.44
Paraffins, vol %: 68.4
Naphthenes, vol %: 23.1
Aromatics, vol %: 8.5
RON, clear: 55.6

Kerosine
Range, °C.: 145-230
Yield, vol %: 15.0
Total sulfur, wt %: 0.25
P/N/A, vol %: 50.9/29.9/19.2
Smoke pt, mm: 22
Aniline pt, °C.: 56.0
Diesel index: 62.1
Cetane index: 56.0

Gas oil
Range, °C.: 145-350
Yield, vol %: 36.6
Gravity, °API: 38.6
Total sulfur, wt %: 1.04
Kin. vis., cSt @ 20° C.: 3.02
@ 40° C.: 1.99
Aniline pt, °C.: 60.8
Diesel index: 54.6
Cetane index: 51.0

Gas oil
Range, °C.: 175-400
Yield, vol %: 39.9
Gravity, °API: 34.1
Total sulfur, wt %: 1.43
UOP factor: 11.65

Residue
Range, °C.: 350+
Yield, vol %: 45.0
Gravity, °API: 14.75
Total sulfur, wt %: 3.0
Kin. vis., cSt @ 50° C.: 351
@ 100° C.: 31.0
Pour pt, °C.: +19
Con. carbon, wt %: 9.1
V/Ni, ppm: 85/27

Dukhan (Qatar Land), Qatar

Umm Said terminal CBM & SBM

Crude
Gravity, °API: 41.7
Sulfur, wt %: 1.28
H_2S g/100 cc: 0.0283
Pour pt, °F.: −20
Rvp, psi: 11.7
Vis., SSU @ 80° F.: 43.3

Gasoline
Range, °F.: 40-155
Yield, vol %: 8.61
Gravity, °API: 86.5
Sulfur, wt %: 0.02
Paraffins, vol %: 95.0
Naphthenes, vol %: 3.9
Aromatics, vol %: 1.1

Light naphtha
Range, °F.: 155-265
Yield, vol %: 11.74
Gravity, °API: 64.3
Sulfur, wt %: 0.02
P/N/A, vol %: 67.8/19.7/12.5

Heavy naphtha
Range, °F.: 265-350
Yield, vol %: 10.65
Gravity, °API: 52.5
Sulfur, wt %: 0.03

P/N/A, vol %: 64.3/13.9/21.1
Dinaphthenes, vol %: 0.7
Smoke pt, calculated: 22.6

Kerosine
Range, °F.: 350-500
Yield, vol %: 15.83
Gravity, °API: 45.0
Cetane index (calculated): 51.1
Sulfur, wt %: 0.14
Aromatics, vol %: 21.1
Smoke pt: 21.0
Freeze pt, °F.: −42
Pour pt, °F.: −45

Heavy gas oil
Range, °F.: 500-650
Yield, vol %: 15.14
Cetane index (calculated): 55.1
Sulfur, wt %: 1.11
Total N, ppm: 35
Chloride, ppm: < 5.0
Pour pt, °F.: 15

Residue
Range, °F.: 650+
Yield, vol %: 32.66
Gravity, °API: 20.3
Sulfur, wt %: 2.58
Vis., SSU @ 210° F.: 73.2

Residue
Range, °F.: 650-1,000
Yield, vol %: 22.79
Gravity, °API: 24.1
Sulfur, wt %: 2.15
Total N, ppm: 525
Rams. carbon, wt %: 0.23
Vis., SSU @ 210° F.: 46.0

Pitch
Range, °F.: 1,000+
Yield, vol %: 9.87
Sulfur, wt %: 3.45
Con. carbon, wt %: 12.75
V/Ni, ppm: 19/3

Eocene (Wafra), Divided Zone

Mina Saud, Divided Zone CBM, also Mina Abdulla, Kuwait

Crude
Gravity, °API: 18.6
Sulfur, wt %: 4.55
Pour pt, °F.: −20
Vis., Saybolt 122° F.: 80.4
Con. carbon, wt %: 8.9
Rvp, psi: 1.1
Salt content, lb/1,000 bbl: 7.0

Light naphtha
Range, °F.: Ibp-200
Yield, vol %: 1.50
Gravity, °API: 77.6
Sulfur, wt %: 0.12
Rvp, psi: 11.4
Paraffins, vol %: 70
Naphthenes, vol %: 29
Aromatics, vol %: 1
RON, clear: 78.0
ASTM, 50% pt, °F.: 154

Heavy naphtha
Range, °F.: 200-435
Yield, vol %: 11.82
Gravity, °API: 51.0
Sulfur, wt %: 0.27
Rvp, psi: 1.4
P/N/A, vol %: 45/40/15
RON, clear: 48
RON, 3 g TEL: 60
ASTM, 50% pt, °F.: 325

Kerosine
Range, °F.: 435-500
Yield, vol %: 5.97
Gravity, °API: 36.9
Sulfur, wt %: 1.0
Aromatics, vol %: 30
Freezing pt, °F.: −66
Smoke pt, mm: 17
Aniline pt, °F.: 133.2
Cetane index: 43
ASTM, 50% pt, °F.: 458

Gas oil
Range, °F.: 500-620
Yield, vol %: 11.15
Gravity, °API: 31.0
Sulfur, wt %: 1.80
Pour pt, °F.: −30
Aniline pt, °F.: 145.8
Cetane index: 47
ASTM, 50% pt, °F.: 562

Residual oil
Range, °F.: 620+
Yield, vol %: 68.03
Gravity, °API: 10.0
Sulfur, wt %: 4.9
Pour pt, °F.: 60
Con. carbon, wt %: 14.83

Residual oil
Range, °F.: 1,044+
Yield, vol %: 39.75
Gravity, °API: 4.6
Sulfur, wt %: 6.1
Con. carbon, wt %: 22.5
V/Ni, ppm: 135/67

Foroozan (Fereidoon), Iran

Kharg Island

Crude
Gravity, °API: 31.3
Sulfur, wt %: 2.50
Rvp, psi: 5.7
H_2S (evolved), wt %: 0.015
Pour pt, °F.: −35
Neut. no., mg KOH/g: 0.70
Rams. carbon, wt %: 5.4
Kin. vis., cSt @ 68°F.: 15.33
V/Ni, ppm: 36/11
C_1-C_5, vol %: 6.35

Naphtha
Range, °F.: C_5-200
Yield, vol %: 9.9
Gravity, °API: 82.6
Sulfur, wt %: 0.017
Charac. factor: 12.72
Paraffins, vol %: 76.8
Naphthenes, vol %: 21.8
Aromatics, vol %: 1.4
RON/MON, clear: 64.3/62.6

Naphtha
Range, °F.: 200-320
Yield, vol %: 10.5
Gravity, API: 58.1
Sulfur, wt %: 0.056
Charac. factor: 12.02
P/N/A, vol %: 71.6/17.2/11.3
RON/MON, clear: 30.2/32.0

Kerosine
Range, °F.: 320-520
Yield, vol %: 17.7
Gravity, °API: 44.3
Sulfur, wt %: 0.435
Charac. factor: 11.84
Aniline pt, °F.: 145.2
Diesel index, °F.: 64.3
Cetane index: 45.4
Freeze pt, °F.: −41
Cloud pt, °F.: −52
Pour pt, °F.: −52
Smoke pt, mm: 22
Vis., SUS @ 68° F.: 32.4

Gas oil
Range, °F.: 520-650
Yield, vol %: 10.8
Gravity, °API: 33.4
Sulfur, wt %: 1.56
Charac. factor: 11.74
Aniline pt, °F.: 161.2
Diesel index: 53.8
Cetane index: 49.4
Cloud pt, °F.: 20
Pour pt, °F.: 19
Vis., SUS @ 68° F.: 48.0

Residuum
Range, °F.: 650+
Yield, vol %: 48.8
Gravity, °API: 13.6
Sulfur, wt %: 4.13
Pour pt, °F.: 34
Rams. carbon, wt %: 9.86
Vis., SUS @ 122 °F.: 3,616.0
V/Ni, ppm: 66/20

Residuum
Range, °F.: 1,050+
Yield, vol %: 20.4
Gravity, °API: 3.8
Sulfur, wt %: 5.6
Pour pt, °F.: 158
V/Ni, ppm: 143/44

Gulf of Suez Mix, Egypt

Ras Shukheir/3 conventional sea berths

Crude
Gravity, °API: 31.9
Sulfur, wt %: 1.52
Rvp, psi: 8.3
Pour pt, °F.: 35
Rams. carbon, wt %: 4.4
Kin. vis., cSt @ 100° F.: 8.74
V/Ni, ppm: 41/25
C_1-C_5, vol % yield: 5.48

Naphtha
Range (TBP), °F.: C_5-200
Yield, vol %: 7.8
Gravity, °API: 79.1
Total sulfur, wt %: 0.018
Rvp, psi: 10.7
Paraffins, vol %: 80.0
Naphthenes, vol %: 18.0
Aromatics, vol %: 2.0
RON, clear: 69.4
MON, clear: 66.1

Naphtha
Range (TBP), °F.: 200-320
Yield, vol %: 10.0
Gravity, °API: 56.7
Total sulfur, wt %: 0.022
Rvp, psi: 1.1
P/N/A, vol %: 57.3/32.7/10.1
RON, clear: 47.2
MON, clear: 43.9

Kerosine
Range (TBP), °F.: 320-520
Yield, vol %: 17.7
Gravity, °API: 42.6
Total sulfur, wt %: 0.395
Aniline pt, °F.: 138.6
Diesel index: 59.1
Cetane index: 43.0
Freeze pt, °F.: −48
Cloud pt, °F.: −42
Smoke pt, mm: 26
Naphthalenes, vol %: 2.88

Gas oil
Range (TBP), °F.: 520-650
Yield, vol %: 11.3
Gravity, °API: 33.9
Total sulfur, wt %: 1.2
Aniline pt, °F.: 159.1
Diesel index: 53.9
Cetane index: 50.21
Cloud pt, °F.: 26
Vis., SUS @ 68° F.: 49.8

Gas oil
Range (TBP), °F.: 650-850
Yield, vol %: 17.2
Gravity, °API: 27.2
Total sulfur, wt%: 1.6
Rams. carbon, wt %: 0.34

Residuum
Range, °F.: 650+
Yield, vol %: 50.8
Gravity, °API: 17.2
Total sulfur, wt %: 2.365
Rams. carbon, wt %: 7.90
Vis., SUS @ 122° F.: 1,146.9
V/Ni, ppm: 73/46

Hout, Divided Zone

Sea berth off Ras Al Khafji

Crude
Gravity, °API: 32.8
Sulfur, wt %: 1.91
Rvp, psi: 4.6
Pour pt, °F.: −13.0
Kin. vis., cSt @ 86° F.: 9.88
Con. carbon, wt %: 5.01
Asphaltenes, wt %: 1.65
Wax content, wt %: 3.2
Neut. no., mg KOH/g: 0.04
C_1-C_4, vol %: 1.8
V/Ni, ppm: 28/6

Light naphtha
Range (TBP), °F.: C_5-176
Yield, vol %: 6.3
Gravity, °API @ 60° F.: 83.7
Sulfur, wt %: 0.029
H_2S, ppm: 19
Rvp, psi. 10.3
RON, clear: 64.6
RON + 3.0 ml TEL/gal: 84.2
MON, clear: 61.0
Paraffins, vol %: 92.6
Naphthenes, vol %: 6.4
Aromatics, vol %: 1.0

Full range naphtha
Range (TBP), °F.: C_5-374
Yield, vol %: 24.5
Gravity, °API: 63.5
Sulfur, wt %: 0.035
H_2S, ppm: 26
Rvp, psi: 4.3
RON, clear: 44.0
MON, clear: 43.6
Aniline pt, °F.: 134
P/N/A, vol %: 70.8/15.6/13.6

Kerosine
Range, °F.: 374-482
Yield, vol %: 11.3
Gravity, API @ 60° F.: 445
Sulfur, wt %: 0.204
Pour pt, °F.: −49
Cloud pt, °F.: −49
Freeze pt, °F.: −42
Smoke pt, mm: 23.5
Aniline pt, °F.: 147
Saturates, vol %: 81.5
Aromatics, vol %: 18.0
Olefins, vol %: 0.5

Gas oil
Range, °F.: 482-644
Yield, vol %: 15.0
Gravity, °API @ 60° F.: 36.0
Sulfur, wt %: 1.07
Kin. vis. @ 100 °F.: 3.954
Pour pt, °F.: 14
Aniline pt, °F.: 163
Cetane index: 56.5

Residue
Range, °F.: 644+
Yield, vol %: 47.4
Gravity, °API @ 60° F.: 16.4
Sulfur, wt %: 3.39
Kin. vis., cSt @ 122° F.: 360.3
Pour pt, °F.: 68
Con. carbon, wt %: 10.3
V/Ni, ppm: 58/13

Residue
Range, °F.: 1,022+
Yield, vol %: 21.8
Gravity, °API @ 60° F.: 7.9
Sulfur, wt %: 4.39
Kin. vis., cSt @ 210° F.: 118.6
Pour pt, °F.: 91
Con. carbon, wt %: 20.7
Asphaltenes, wt %: 6.42
V/Ni, ppm: 110/31

Iranian Heavy, Iran

Kharg Island

Crude
Gravity, °API: 31.0
Total sulfur, wt %: 1.65
Vis., cSt @ 70° F.: 16.84
Vis., cSt @ 100° F.: 9.36
Pour pt, °F.: −5
C_1-C_4 yield, vol %: 2.38

Gasoline
Range (TBP), °C.: C_5-65
Yield, vol %: 3.49
Sp. gr. 60/60 °F.: 0.6468
RON, clear: 73.0
Paraffins, wt %: 93.5
Naphthenes, wt %: 5.7
Aromatics, wt %: 0.8

Light naphtha
Range, °C.: 65-149
Yield, vol %: 14.53
Sp. gr., 60/60 °F.: 0.7392
Total sulfur, wt %: 0.088
P/N/A, wt %: 53.4/33.1/13.5

Heavy naphtha
Range, °C.: 149-262
Yield, vol %: 18.26
Sp. gr., 60/60 °F.: 0.8041
Total sulfur: 0.289
Freezing pt, °C.: −50.0
Aromatics, vol %: 17.8
Aniline pt, °C.: 59.1
Smoke pt, mm: 23

Gas oil
Range, °C.: 262-352
Yield, vol %: 14.60
Total sulfur, wt %: 1.22
Cloud pt, °F.: 28
Pour pt, °F.: 24
Diesel index: 52

Residue
Range, °C.: 352+
Yield, vol %: 46.74
Total sulfur, wt %: 2.55
Vis., cSt @ 122° F.: 614
Vis, cSt @ 210° F.: 49.8
Con. carbon, wt %: 9.9
Asphaltenes, wt %: 3.8
V/Ni, ppm: 139/58

Assay sample taken at production rate of 1.84 million b/d with following field contributions in b/d:

Ahwaz—700,000
Gachsaran—628,000
Bibi Hakimeh—269,000
Kharg, Kupal, Monsuri and Rag E. Safid—251,000

Iranian Light, Iran

Kharg Island

Crude
Gravity, °API: 33.8
Pour pt, °F.: −20
Total sulfur, wt %: 1.35
Vis., cSt @ 70° F.: 10.58
@ 130° F.: 4.22

Gasoline
Range, °C.: C_5-65
Yield, vol %: 3.86
Sp. gr. 60/60° F.: 0.6465
RON, clear: 72.4
Paraffins, wt %: 94.4
Naphthenes, wt %: 4.8
Aromatics, wt %: 0.8

Light naphtha
Range, °C.: 65-149
Yield, vol %: 14.17
Sp. gr. 60/60° F.: 0.7387
Total sulfur, wt %: 0.040
P/N/A, wt %: 57.5/31.1/11.4

Heavy naphtha
Range, °C.: 149-262
Yield, vol %: 20.45
Sp. gr., 60/60° F.: 0.8028
Total sulfur, wt %: 0.198
Freezing pt, °C.: − —49
Aromatics, vol %: 18.0
Aniline pt, °C: 60.3
Smoke pt, mm: 24

Gas oil
Range, °C.: 262-352
Yield, vol %: 15.32
Sp. gr. 60/60° F.: 0.8599
Total sulfur, wt %: 1.05
Cloud pt, °F.: 28
Pour pt, °F.: 24
Diesel index: 53

Residue
Range, °C.: 352+
Yield, vol %: 43.3
Sp. gr. 60/60° F.: 0.9531
Total sulfur, wt %: 2.42
Vis., cSt @ 122° F.: 297.0
@ 210° F.: 29.8
Con. carbon, wt %: 9.0
Asphaltenes, wt %: 1.2
V/Ni, ppm: 70/32

Assay sample taken at production rate of 2.6 million b/d with following field contributions in b/d:

Agha Jari—870,000
Marun—1.03 million
Karanj—356,000
Paris—279,000
Pazanan—33,000

Khafji, Divided Zone

Sea berth off Ras Al Khafji

Crude
Gravity, °API: 28.5
Sulfur, wt %: 2.85

H_2S (dissolved), ppm: <1
Rvp, psi: 7.6
Pour pt, °F.: −31
Kin. vis., cSt @ 86° F.: 21.3
Con. carbon residue, wt %: 8.04
Asphaltenes, wt %: 4.32
Wax content, wt %: 2.7
Neut. no., mg KOH/g: 0.18
C_1-C_4, vol %: 3.41
V/Ni, ppm: 55/16

Light naphtha
Range (TBP), °F.: C_5-176
Yield, vol %: 5.5
Gravity, °API @ 60°F.: 85.2
Sulfur, wt %: 0.0028
Rvp, psi: 10.8
RON, clear: 66.2
RON + 1.0 ml TEL/gal: 78.5
MON, clear: 63.4
Paraffins, vol %: 93.9
Naphthenes, vol %: 5.4
Aromatics, vol %: 0.7

Full range naphtha
Range (TBP), °F.: C_5-374
Yield, vol %: 20.4
Gravity, °API @ 60° F.: 65.0
Sulfur, wt %: 0.0264
Rvp, psi: 4.3
RON, clear: 41.0
RON + 1 ml TEL/gal: 53.1
MON, clear: 41.2
Aniline pt, °F.: 139
P/N/A, vol %: 73.4/15.4/11.2

Kerosine
Range (TBP), °F.: 374-482
Yield, vol %: 9.5
Gravity, °API @ 60° F.: 44.5
Sulfur, wt %: 0.324
Cloud pt, °F.: −45
Freeze pt, °F.: −45
Smoke pt, mm: 23.7
Aniline pt, °F.: 145
Saturates, vol %: 80.5
Aromatics, vol %: 19.0
Olefins, vol %: 0.5

Gas oil
Range (TBP), °F.: 482-644
Yield, vol %: 13.9
Sulfur, wt %: 1.42
Kin. vis. @ 100° F.: 3.9
Pour pt, °F.: 10
Cloud pt, °F.: 10
Aniline pt, °F.: 156
Cetane index: 54.2

Residue
Range (TBP), °F.: 644+
Yield, vol %: 52.8
Gravity, °API @ 60° F.: 12.1
Sulfur, wt %: 4.46
Kin. vis., cSt @ 122° F.: 1,795
Pour pt, °F.: 50
Con. carbon, wt %: 13.4
Asphaltenes, wt %: 7.84
V/Ni, ppm: 95/28

Residue
Range (TBP), °F.: 991+
Yield, vol %: 27.8
Gravity, °API @ 60°F.: 4.5
Sulfur, wt %: 5.65
Kin. vis., cSt @ 210° F.: 6,043
Pour pt, °F.: 145
Con. carbon, wt %: 24.4
Asphaltenes, wt %: 15.4
V/Ni, ppm: 170/49

Kirkuk Blend, Iraq

Mina-al-Bakr sea terminal in Persian Gulf also Ceyhan (Dortyol), Turkey

Crude
Gravity, °API: 35.1
Sulfur, wt %: 1.97
Pour pt, °C.: −22
Kin. vis., cSt @ 10° C.: 12.8
C_4 & lighter, wt %: 1.8

Light SR naphtha
Range, °C.: C_5-65
Yield, wt %: 4.1
Density @ 15° C., g/cu m: 0.644
RON + 0.4 g Pb/l: 81

Heavy SR naphtha
Range, °C.: 65-175
Yield, wt %: 18.1
Density @ 15° C., g/cu m: 0.740
RON + 0.4 g Pb/l: 58.5
Aromatics, vol %: 10.5
Naphthenes, vol %: 22

Kerosine
Range, °C.: 175-225
Yield, wt %: 8.7
Density @ 15° C., g/cu m: 0.794
Sulfur, wt %: 0.19

Gas oil
Range, °C.: 225-360
Yield, wt %: 24.0
Density @ 15° C., g/cu m: 0.843
Sulfur, wt %: 1.18
Pour pt, °C.: −12
Cold filter pour pt, °C.: −9
Kin. vis., cSt @ 100° C.: 1.34

Heavy gas oil
Range, °C.: 360-525
Yield, wt %: 22.9
Density @ 15° C., g/cu m: 0.917
Sulfur, wt %: 2.35
Kin. vis., cSt @ 100° C.: 7.98

Long residuum
Range, °C.: 360+
Yield, wt %: 43.3
Density @ 15° C., g/cu m: 0.968
Sulfur, wt %: 3.76
Kin. vis., cSt @ 100° C.: 42.9

Short residuum
Range, °C.: 525+
Yield, wt %: 20.4
Density @ 15° C., g/cu m: 1.003
Sulfur, wt %: 5.30
Kin. vis., cSt @ 100° C.: 1,550
Con. carbon, wt %: 21.0
V/Ni, ppm: 142/54

Kuwait Export, Kuwait

Mina al Ahmadi

Crude
Gravity, °API: 31.4
Vis., SUV, sec @ 100° F.: 58.1
Pour pt, °F.: +5
Sulfur, wt %: 2.52
Ni/V (calc.), ppm: 8/30
Rvp, psi: 6.7
H_2S, wt %: <0.001
C_1-C_4 (GC analysis), vol %: 3.03

Naphtha
Range, °F.: Over point — 140
Yield, vol %: 3.80
Gravity, °API: 89.7
Sulfur, wt %: 0.04
RON (micro), clear: 71.8
RON + 3 ml TEL: 89.3

Naphtha
Range, °F.: 140-170
Yield, vol %: 2.26
Gravity, °API: 78.6
Sulfur, wt %: 0.02
Aniline pt, °F.: 147.7
RON, clear/ + 3 ml TEL: 58.2/80.40
Paraffins, vol %: 88.5
Monocycloparaffins, vol %: 9.9
Aromatics, total, vol %: 1.6

Heavy naphtha
Range, °F.: 170-310
Yield, vol %: 11.91
Gravity, °API: 62.1
Sulfur, wt %: 0.03
Aniline pt, °F.: 136.2
Paraffins, vol %: 70.1
Monocycloparaffins, vol %: 20.4
Dicycloparaffins, vol %: 0.4
Aromatics, total, vol %: 9.1

Kerosine
Range, °F.: 310-520
Yield, vol %: 18.43
Gravity, °API: 45.9
Pour pt, °F.: −45
Sulfur, wt %: 0.39
Aniline pt, °F.: 142.9
Cetane index: 53.8
Smoke pt, mm: 26

Heating oil
Range, °F.: 520-680
Yield, vol %: 14.89
Gravity, °API: 32.9
Vis., SUV, sec. @ 100° F.: 43.3
Pour pt, °F.: +20
Total N, ppm: 100
Sulfur, wt %: 1.98
Aniline pt, °F.: 160.2
Cetane index: 54.3

Gas oil
Range, °F.: 680-1,000
Yield, vol %: 24.09
Gravity, °API: 21.4
Pour pt, °F.: +100
Sulfur, wt %: 3.12
Total N, ppm: 900
Ni/V, ppm: <0.1/<0.1
Vis., SUV, sec @ 130° F.: 175.2
Rams. carbon residue, wt %: 0.47

Residuum
Range (VEFV), °F.: 1,000+
Yield, vol %: 21.78
Gravity, °API: 5.8
Sulfur, wt %: 5.11
V/Ni, ppm: 116/34
Vis., SUV, sec @ 250° F.: 3,394
Rams. carbon residue, wt %: 21.9

Mubarek, Sharjah, U.A.E.

Floating storage and loading facility in offshore producing area

Crude
Gravity, °API: 37
Sulfur, wt %: 0.62
Rvp, psi: 4.8
Pour pt, °F.: 10
Salt, lb/1,000 bbl: 23
Vis., cSt @ 100° F.: 3.20
@ 122° F.: 2.80
Gas, vol % of crude: 0.7

Light straight run
Range, °F.: ibp-220
Yield, vol %: 12.7
Octane, F-1 clear: 68.2
Gravity, °API: 72.2
Rvp, psi: 11.8
Sulfur, wt %: 0.01

Light naphtha
Range, °F.: 220-300
Yield, vol %: 9.1
Paraffins, vol %: 51.6
Naphthenes, vol %: 30.4
Aromatics, vol %: 18.0
Octane, F-1 clear: 50.5
Gravity, °API: 55.2
Sulfur, wt %: 0.01

Heavy naphtha
Range, °F.: 300-360
Yield, vol %: 7.2
P/N/A, vol %: 48.5/28.8/22.7
Gravity, °API: 49.9
Sulfur, wt %: 0.01

Kerosine
Range, °F.: 360-500
Yield, vol %: 17.6
Gravity, °API: 42.7
Smoke pt, mm: 25
Aniline pt, °F.: 134
Diesel index: 57.2
Pour pt, °F.: −55
Sulfur, wt %: 0.04
Vis., cSt @ 100° F.: 1.40

Light gas oil
Range, °F.: 500-700
Yield, vol %: 21.4
Gravity, °API: 32.6
Aniline pt, °F.: 156
Diesel index: 50.9
Pour pt, °F.: 20
Rams. carbon residue, wt %: 0.66
Sulfur, wt %: 0.66
Vis., cSt @ 100° F.: 4.55
@ 210° F.: 1.54
Bromine no.: 0.6

Residuum
Range, °F.: 700+
Yield, vol %: 30.8
Gravity, °API: 19.6
Rams. carbon residue, wt %: 4.74
Sulfur, wt %: 1.18

Residuum
Range, °F.: 1,000+
Yield, vol %: 9.2
Gravity, °API: 12.2
Rams. carbon residue, wt %: 15.09
Sulfur, wt %: 1.43
V/Ni, ppm: 11.40/6.0

Murban, Abu Dhabi

Port of Jebel Dhanna/4 CBM berths

Crude
Gravity, °API: 40.45
Rvp @ 37.8° C., psia: 3.46
Pour pt, °C.: −24
Kin. vis., cSt @ 40° C.: 2.70
Sulfur, wt %: 0.78
V/Ni, ppm: <0.1/0.7
Con. carbon, wt %: 1.35
Charac. factor, K_{UOP}: 12.1

Naphtha
Range (TBP), °C.: 20-165
Yield, vol %: 27.4
Position on crude, vol %: 1.9-29.3
Gravity, °API: 63.47
Sulfur, ppm: 43
RON, clear: 50

Naphtha
Range (TBP), °C.: 20-180
Yield, vol %: 31.2
Position on crude, vol %: 1.9-33.1
Gravity, °API: 61.48
Sulfur, ppm: 64
RON, clear: 47

Kerosine
Range (TBP), °C.: 150-220
Yield, vol %: 16.6
Position on crude, vol %: 25.3-41.9
Gravity, °API: 18.22
Smoke pt, mm: 24
Freeze pt, °C.: −46
Aromatics, vol %: 21
Aniline pt, °C.: 55.2
Sulfur, wt %: 0.022

Diesel
Range (TBP), °C.: 220-350
Yield, vol %: 26.0
Gravity, °API: 37.37
Sulfur, wt %: 0.62
Cloud pt, °C.: −12
Pour pt, °C.: −12
Vis., cSt @ 100° C.: 1.25
Aniline pt, °C.: 72.3
Diesel index: 60.6
Cetane index: 60
Con. carbon on 10% residue, wt %: <0.01

Residuum
Range (TBP), °C.: 350+
Yield, vol %: 32.1
Gravity, °API: 22.72
Sulfur, wt %: 1.73
Vis., cSt @ 100° C.: 10.85
Con. carbon, wt %: 4.3
Asphaltenes, wt %: 0.15
Pour pt, °C.: +33
V/Ni, ppm: 0.4/2.0
Flash pt, °C.: 214
Nitrogen, wt %: 0.125

Residuum
Range (TBP), °C.: 540+
Yield, vol %: 9.3
Gravity, °API: 13.99
Sulfur, wt %: 2.20
Vis., cSt @ 50° C.: 3,340
Con. carbon, wt %: 11.5
Asphaltenes, wt %: 0.74

Oman Export, Oman

Mina al Fahal

Crude
Gravity, °API: 36.3
Sulfur, wt %: 0.79
Pour pt, °F.: −15
Rvp, psi: 4.2
Vis., SUS @ 60° F.: 64.8
Yield, ibp to 113 °F., vol %: 3.63

Fraction yields (partial)
Range/vol %:
390-450/6.73
450-500/5.74
500-550/5.64
550-650/10.76

Straight run
Range, °F.: 113-220
Yield, vol %: 7.54
Gravity, °API: 70.4
RON + 3 cc Pb: 74.2
Sulfur, wt %: 0.0
Paraffins, vol %: 77.0
Naphthenes, vol %: 18.24
Aromatics, vol %: 4.8

Naphtha
Range, °F.: 220-390
Yield, vol %: 17.77
Gravity, °API: 55.3
Sulfur, wt %: 0.03
P/N/A, vol %: 67.6/21.3/10.1
Dinaphthenes, vol %: 1.0

Kerosine
Range, ° F.: 315-500
Yield, vol %: 20.56
Gravity, °API: 46.5
Sulfur wt %: 0.12
Aromatics, vol %: 12.9
Smoke pt, mm: 26
Freeze pt, °F.: −56
Pour pt, °F.: −70

Light gas oil
Range, °F.: 450-650
Yield, vol %: 22.14
Gravity, °API: 37.5
Cetane index: 57.0
Sulfur, wt %: 0.42
Total N, ppm: 31
Aniline pt, °F.: 168.3
Pour pt, °F.: −15

Heavy gas oil
Range, °F.: 650-1,000
Yield, vol %: 26.15
Gravity, °API: 26.8
Sulfur, wt %: 0.98
Total N, ppm: 516
Pour pt, °F.: 70
Carbon residue, wt %: 0.14

Flashed residue
Range, °F.: 1,000+
Yield, vol %: 16.03
Gravity, °API: 14.2
Sulfur, wt %: 1.96
Vis., SSF @ 210 °F.: 196.0

Qatar Marine, Qatar

Halul Island

Crude
Gravity, °API: 35.3
Sulfur, wt %: 1.57
Pour pt, °F.: 10
H_2S g/100 cc: 0.0315
Vis., SSU @ 60° F.: 53.4

Light straight run
Range, °F.: 40-155
Yield, vol %: 6.45
Gravity, °API: 82.5
Sulfur, wt %: 0.05
P/N/A, vol %: 88.7/9.5/1.7

Light naphtha
Range, °F.: 155-265
Yield, vol %: 9.45
Sulfur, wt %: 0.03
Paraffins, vol %: 60.6
Naphthenes, vol %: 23.3
Aromatics, vol %: 16.1

Heavy naphtha
Range, °F.: 265-350
Yield, vol %: 10.07
Gravity, °API: 51.8
Sulfur, wt %: 0.04
P/N/A: 56.7/18.5/22.9
Dinaphthenes, vol %: 1.9

Kerosine
Range, °F.: 350-500
Yield, vol %: 16.28
Gravity, °API: 43.1
Cetane index (calculated): 47.5
Sulfur, wt%: 0.18
Aromatics, vol %: 24.0
Smoke pt, mm: 19.0
Freeze pt, °F.: −44
Pour pt, °F.: −50

Heavy gas oil
Range, °F.: 500-650
Yield, vol %: 15.50
Cetane index (calculated): 51.6
Sulfur, wt %: 1.24
Total N, ppm: 72
Pour pt, °F.: 25

Residue
Range, °F.: 650+
Yield, vol %: 39.53
Gravity, °API: 16.5
Sulfur, wt %: 2.73
Vis., SUS @ 210° F.: 121.5

Residue
Range, °F.: 1,000+
Yield, vol %: 19.33
Gravity, °API: 10.3
Sulfur, wt %: 3.4
Con. carbon, wt %: 12.5
V/Ni, ppm: 31/7

Rostam, Iran

Lavan Island terminal

Crude
Gravity, °API: 35.9
Vis., cSt @ 50° C.: 3.08
Pour pt, °C.: −22.5
Sulfur, wt %: 1.55
NaCl, wt%: 0.036

Gasoline
Range, °F.: Ibp-165
Yield, vol %: 24.2
RON, clear: 61.4

Kerosine
Range, °C.: 165-220
Yield, vol %: 11.2

Gas oil
Range, °C.: 220-310
Yield, vol %: 17.3

Residuum
Yield, vol %: 45.8
Pour pt, °C.: +12.5
Sulfur, wt %: 2.82
Carbon, wt %: 6.25

Note: Same assay first published in 1976.

Salmon (Sassan), Iran*

Levan Island

Crude
Gravity, °F.: 33.9
Paraffin, wt%: 1.9
Sulfur, wt %: 1.91
Pour pt, °F.: −5
Vis., SUS @ 77° F.: 52.1
@ 100° F.: 44.2
Bs&w: 17,550

Straight-run gasoline
Range, vapor-cut points, °F.: 50-200
Yield, vol %: 10.5
Gravity, °API: 77.6
Sulfur, wt %: 0.081
Mercaptan sulfur: 0.067
Octane no., F-1 clear: 61.0

Naphtha
Range, VCP, °F.: 200-375
Yield, vol %: 16.4
Gravity, °API: 53.3
Sulfur, wt %: 0.0820
Mercaptan S, wt %: 0.002
Aniline pt, °F.: 121.5
Octane no., F-1 clear: 35.4
Arom. + naphthenes, vol %: 41

Kerosine
Range VCP, °F.: 375-450
Yield, vol %: 7.5
Gravity, °API: 45.1
Sulfur, wt %: 0.19
Freezing pt, °F.: −50
Aniline pt, °F.: 137.9
Smoke pt, mm: 20
Kin. vis., cSt @ 60° F.: 2.05
@ 100° F.: 30

Gas oil
Range VCP, °F.: 450-700
Yield, vol %: 23.8
Gravity, °API: 34.1
Sulfur, wt %: 1.2
Pour pt, °F.: +15
Aniline pt, °F.: 153.3
Kin. vis., cSt @ 60° F.: 7.52
@ 100° F.: 4.03
Cetane no.: 56.3

Residual oil
Range VCP, °F.: 700+
Yield, vol %: 39.7
Gravity, °API: 15.3
Sulfur, wt %: 3.5
Pour pt, °F.: +75
Vis., SUS @ 210° F: 154
@ 275° F.: 67.8
V + Ni, ppm: 44

Residual oil
Range, VCP, °F.: 1,070+
Yield, vol %: 12.0
Gravity, °API: 1.3
Sulfur, wt %: 5.0
Vis., SUS @ 210° F.: 8,000
@ 275° F.: 1,000
V + Ni, ppm: 127

* New assay not available. This one first published in OGJ in 1976. Sassan is produced from same reservoir as Abu Al Bu Khoosh.

Sirri, Iran

Offshore terminal in Persian Gulf producing area

Crude
Gravity, °API: 30.9
Kin. vis., cSt @ 10° C.: 20.3
@ 37.8° C.: 7.36
Pour pt, °C.: −9
Total sulfur, wt %: 2.3
Rvp, bars: 0.650
Paraffins, wt %: 3.43
Asphaltenes, wt %: 1.48
V/Ni/Fe, ppm: 41/12/3
Yield C_1—C_5, vol %: 7.14

Light gasoline
Range, °C.: C_5-80
Yield, vol %: 5.19
RON, clear: 64.1
Total sulfur, wt %: 0.0080

Heavy gasoline
Range, °C.: 80-180
Yield, vol %: 15.28
Paraffins, vol %: 59.0
Naphthenes, vol %: 30.0
Aromatics, vol %: 11.0
Sulfur, wt %: 0.078

Kerosine
Range, °C.: 180-225
Yield, vol %: 7.54
Smoke pt, mm (150°-225° C.): 18.50
Sulfur, wt %: 0.436

Gas oil
Range, °C.: 180-350
Yield, vol %: 29.61
Pour pt, °C.: −21
Total sulfur, wt %: 1.42
Aniline pt, °C.: 62.2
Diesel index (calculated): 51.9

Residue
Range, °C.: 350+
Yield, vol %: 46.33
Pour pt, °C.: +21
Kin. vis., cSt @ 50° C.: 375
@ 70° C.: 120
Total sulfur, wt %: 3.65
Asphaltenes, wt %: 3.01
Con. carbon, wt %: 9.53
V/Ni/Fe, ppm: 70/20/4

Soroosh (Cyrus), Iran

Offshore terminal with SBM in production area

Crude
Gravity, °API: 18.1
Sulfur, wt %: 3.3
Rvp, psi: 0.3
H_2S (evolved), wt %: 0.007
Pour pt, °F.: 10
Neut. no., mg KOH/g: 0.50
Rams. carbon, wt %: 12.2
Kin. vis., cSt @ 68° F.: 1,381.4
V/Ni, ppm: 101/35
C_1-C_5, vol %: 1.32

Naphtha
Range, °F.: C_5-200
Yield, vol %: 3.3
Gravity, °API: 77.3
Sulfur, wt %: 0.008
Charac. factor: 12.49
Paraffins, vol %: 69.1
Naphthenes, vol %: 29.7
Aromatics, vol %: 1.1
RON/MON, clear: 73.5/70.6

Naphtha
Range, °F.: 200-320
Yield, vol %: 5.1
Gravity, °API: 57.8
Sulfur, wt %: 0.021
Charac. factor: 12.00
P/N/A, vol %: 49.0/42.2/8.8
RON/MON, clear: 49.9/50.5

Kerosine
Range, °F.: 320-520
Yield, vol %: 11.6
Gravity, °API: 42.5
Sulfur, wt %: 0.37
Charac. factor: 11.76
Aromatics, vol %: 15.7
Aniline pt, °F.: 140.8
Diesel index: 59.8
Cetane index: 44.6
Freeze pt, °F.: −46
Cloud pt, °F.: −41
Pour pt, °F.: −55
Smoke pt, mm: 25
Neut no., mg KOH/g: 0.10
Vis., SUS @ 68° F.: 32.6

Gas oil
Range, °F.: 520-650
Yield, vol %: 9.6
Gravity, °API: 33.0
Sulfur, wt %: 1.19
Charac. factor: 11.72
Aniline pt, °F.: 152.9
Diesel index: 50.5

Cetane index: 49.0
Cloud pt, °F.: 11
Pour pt, °F.: 6
Naphthalenes, vol %: 13.68
Vis., SUS @ 68 °F.: 47.9

Residuum
Range, °F.: 650°
Yield, vol %: 70.1
Gravity, °API: 9.2
Sulfur, wt %: 4.3
Pour pt, °F.: 99
Rams. carbon, wt %: 16.31
Vis., SUS @ 210° F.: 1,439.8
V/Ni, ppm: 135/47

Residuum
Range, °F.: 1,050 +
Yield, vol %: 36.5
Gravity, °API: −0.2
Sulfur, wt %: 5.6
Pour pt, °F.: 213
V/Ni, ppm: 237/82

Souedie, Syria

Tartus/CBMs

Crude
Gravity, °API: 24.9
Sulfur, wt %: 3.82
Pour pt, °C.: −30
Kin. vis. @ 10° C.: 88.3
C_4 & lighter: 0.8

Light SR naphtha
Range, °C.: C_5-65
Yield, wt %: 3.2
Density @ 15° C., g/cu cm: 0.647
RON + 0.4 g Pb/l: 79.5

Heavy SR naphtha
Range, °C.: 65-175
Yield, wt %: 13.1
Density @ 15° C., g/cu m: 0.734
RON + 0.4 g Pb/l: 58
Naphthenes, vol %: 18
Aromatics, vol %: 10.5

Kerosine
Range, °C.: 175-225
Yield, wt %: 6.0
Density @ 15° C., g/cu m: 0.798
Sulfur, wt %: 0.38

Gas oil
Range, °C.: 225-360
Yield, wt %: 19.7
Density @ 15° C., g/cu m: 0.865
Sulfur, wt %: 2.50
Pour pt, °C.: −14
CFPP, °C.: −11
Kin. vis., cSt @ 100° C.: 1.40

Heavy gas oil
Range, °C.: 360-425
Yield, wt %: 9.8
Density @ 15° C., g/cu m: 0.925
Sulfur, wt %: 3.90
Kin. vis., cSt @ 100° C.: 4.3

Long residuum
Range, °C.: 360 +
Yield, wt %: 57.2
Density @ 15° C., g/cu m: 1.015
Sulfur, wt %: 5.90
Kin. vis., cSt @ 100° C.: 330.0

Short residuum
Range, °C.: 425 +
Yield, wt %: 47.4
Density @ 15° C., g/cu m: 1.040
Sulfur, wt %: 6.0
Kin. vis., cSt @ 100° C.: 1,800
Con. carbon residue, wt %: 21.5
V/Ni, ppm: 185/60

Umm Shaif (Abu Dhabi Marine), Abu Dhabi

Das Island

Crude
Gravity, °API: 37.4
Sulfur, wt %: 1.51
Pour pt, °C.: −30
Rvp @ 37.8° C., psia: 7.05
H_2S, ppm: <2
Asphalt, wt %: 0.13

Light naphtha
Range (TBP), °C.: C_5-80
Yield, vol %: 8.2
Gravity, °API: 83.1
Charac. factor K: 12.73
Sulfur, ppm : 1,030
RON, clear: 65
RON + 1.5 ml/v.s. gal TEL: 74.5
MON, clear: 61

Heavy naphtha
Range (TBP), °C.: 80-150
Yield, vol %: 13.7
Gravity, °API: 59.26
Sulfur, wt %: 0.052

Kerosine
Range (TBP), °C.: 150-230
Yield, vol %: 15.8
Gravity, °API: 47.53
Freeze pt, °C.: −53.0
Aniline pt, °C.: 54.6
Aromatics, vol %: 21.0
Smoke pt, mm: 23.0
Sulfur, wt %: 0.095

Diesel
Range (TBP), °C.: 230-375
Yield, vol %: 25.8
Gravity, °API: 34.49
Sulfur, wt %: 1.18
Pour pt, °C.: −12
Aniline pt, °C.: 69.6
Diesel index: 54.8
Cetane index: 51.2

Residue
Range (TBP), °C.: 350 +
Yield, vol %: 37.4
Gravity, °API: 19.1
Kin. vis., cSt @ 50° C.: 104.7
Pour pt, °C.: +27
Sulfur, wt %: 2.78
Asphaltenes, wt %: 0.1
Con. carbon, wt %: 5.3
V/Ni, ppm: 7.1/1.9

Residue
Range (TBP), °C.: 550 +
Yield, vol %: 12.3
Gravity, °API: 10.15
Kin. vis., cSt @ 100° C.: 315
Pour pt, °C.: +21
Sulfur, wt %: 3.73
Asphaltenes, wt %: 0.24
Con. carbon, wt %: 14.4
V/Ni, ppm: 19.0/5.0

Zakum (Lower Zakum/Abu Dhabi Marine), Abu Dhabi

Das Island

Crude
Gravity, °API: 40.6
Rvp @ 37.8 °C., psia: 8.37
Pour pt, °C.: −21
Kin. vis., cSt @ 20° C.: 4.28
Sulfur, wt %: 1.05
Charac. factor, K_{UOP}: 12.28
Asphaltene content, wt %: 0.05

Light straight run
Range (TBP), °C.: C_5-80
Yield, vol %: 8.6
Gravity, API: 82.7
Rvp @ 100 °F., psia: 11.6
Sulfur, ppm: 1.5
RON, clear: 66
MON, clear: 64

Naphtha
Range (TBP), °C.: C_5-160
Yield, vol %: 25.60
Gravity, °API: 66.5
Sulfur, ppm: 16.0

Kerosine
Range (TBP), °C.: 160-250
Yield, vol %: 18.8
Gravity, °API: 46.15
Kin. vis., cSt @ −20° C.: 4.10
Freeze pt, °C.: −48
Aniline pt, °C.: 58
Aromatics, vol %: 21.7
Smoke pt, mm: 23.5
Sulfur wt %: 0.063

Diesel
Range (TBP), °C.: 190-343
Yield, vol %: 29.30
Gravity, °API: 39.52
Sulfur, wt %: 0.52
Cloud pt, °C.: −18
Pour pt, °C.: −21
Vis., cSt @ 40° C.: 2.20
Aniline pt, °C.: 66.8
Diesel index: 60.2
Cetane index: 56.5

Residue
Range, °C.: 350 +
Yield, vol %: 33.7
Gravity, °API: 21.8
Kin. vis., cSt @ 50° C.: 69.1
Pour pt, °C.: +33
Sulfur, wt %: 2.2
Asphaltenes, wt %: 0.2
Con. carbon, wt %: 4.0
V/Ni, mg/kg: 1.0/0.9

Residue
Range, °C.: 550 +
Yield, vol %: 10.10
Gravity, °API: 13.2
Kin. vis., cSt @ 100° C.: 147.6
Pour pt, °C.: +18
Sulfur, wt %: 2.96
Asphaltenes, wt %: 1.0
Con. carbon, wt %: 13.6
V/Ni, mg/kg: 3.0/2.5

North Sea

Argyll, U.K. North Sea

SBM in producing area

Crude
Density @ 15° C.: 0.8349
Sulfur, wt %: 0.18
Pour pt, °C.: +6
Vis., cSt @ 40° C.: 4.79

Naphtha
Range, °C.: Ibp—175
Yield, vol %: 25.2
Density @ 15° C.: 0.728
Sulfur, wt %: <0.001

Kerosine
Range, °C.: 175-260
Yield, vol %: 14.9

Density @ 15° C.: 0.804
Sulfur, wt %: 0.03
Copper strip test: 1.A
Smoke pt, mm: 22
Freeze pt, °C.: —37

Gas oil
Range, °C.: 260-360
Yield, vol %: 18.9
Density @ 15° C.: 0.839
Sulfur, wt %: 0.11
Cetane index: 64.5
Cloud pt, °C.: 0
Pour pt, °C.: —3
Cold filter pt, °C.: —2
Vis., cSt @ 40° C.: 4.45

Residue
Range, °C.: 360+
Yield, vol %: 40.6
Density @ 15° C.: 0.9136
Sulfur, wt %: 0.34
V/Ni/Fe, ppm: 3.9/2.1/2.7
Pour pt, °C.: +30
Vis., cSt @ 100° C.: 17.19

Auk, U.K. North Sea

SBM in producing area

Crude
Gravity, °API @ 60° F.: 37.15
Sulfur, wt %: 0.45
Wax, wt %: 6.5
Pour pt (ASTM max.), °C./°F.: +9/+50
Kin. vis., cSt @ 40° C.: 4.38
H_2S existent/potential ppm: <1/<1
Acid value, mg KOH/g (TAN): 0.13
Rvp, lb: 6
C_4—, vol %/wt %: 2.2/1.5

Gasoline
Range, °C.: C_5—85
Yield, vol %/wt %: 8.0/6.5
Sp gr @ 15° C.: 0.685
RON, clear: 66
RON + 0.5 g Pb/l Pb: 82

Naphtha
Range, °C.: 85-165
Yield, vol %/wt %: 15.5/14.0
Sp gr @ 15° C.: 0.755
Sulfur, wt %: 0.002
P/N/A, wt %: 51/34/15

Kerosine
Range, °C.: 165-235
Yield, vol %/wt %: 13.0/12.5
Sp gr @ 15° C.: 0.802
Sulfur, wt %: 0.01
Smoke pt, mm: 25
Aromatics, vol %: 19

Gas oil
Range, °C.: 235-300
Yield, vol %/wt %: 12.5/12.4
Sp gr @ 15° C.: 0.828
Sulfur, wt %: 0.09
Cetane no.: 60
Cloud pt, °C: —19

Gas oil
Range, °C.: 300-350
Yield, vol %/wt %: 9.4/9.6
Sp gr @ 15° C.: 0.847
Sulfur, wt %: 0.35
Cetane no.: 63
Cloud pt, °C.: +9
Kin. vis., cSt @ 40° C.: 5.53

Residue
Range, °C.: 350+
Yield, vol %/wt %: 39.2/43.5
Sp gr @ 15° C.: 0.932
Sulfur, wt %: 0.93
Wax, wt %: 13
Pour pt, °C.: +45
Kin vis., cSt @ 60° C.: 96.7
@ 100° C.: 20.7
Acid value: 0.15
Asphaltenes, wt %: 4.0
Con. car. residue: 7%
V/Ni, ppm: 14/3

Beatrice, U.K. North Sea

Nigg Bay terminal

Crude
Gravity, °API: 38.7
Sulfur, wt %: 0.05
Pour pt, °F.: 55
Rvp, psi.: 5.60
Vis., cSt @ 104° F.: 6.85
@ 122° F.: 5.15
C_1—C_5, yield, vol %: 3.77

Light naphtha
Range, VT °F.: 68-158
Yield, vol %: 3.6
Gravity, °API: 86.5
Rvp, psi: 7.9
RON, clear: 64.6
MON, clear: 63.2
Paraffins, vol %: 93.1
Naphthenes, vol %: 6.2
Aromatics, vol %: 0.7

Naphtha
Range, °F.: 158-212
Yield, vol %: 3.5
Gravity, °API: 67.0
Total sulfur, wt %: 0.0002
P/N/A, vol %: 63.7/32.0/4.3

Heavy naphtha
Range, °F.: 212-302
Yield, vol %: 7.3
Gravity, °API: 59.4
Total sulfur, wt %: 0.0004
P/N/A vol %: 69.2/18.6/12.2

Kerosine
Range, °F.: 302-401
Yield, vol %: 8.8
Gravity, °API: 52.4
Total sulfur, wt %: 0.0024
Smoke point, mm: 37
Freeze pt, °F.: —67
Cloud pt, °F.: —70
Pour pt, °F.: —75
Aniline pt, °F.: 148.4
Diesel index: 78
Aromatics, vol %: [illegible]
Vis., cSt @ 100° F.: 1.08
@ 210° F.: 0.59

Middle distillate
Range, °F.: 401-509
Yield, vol %: 10.8
Gravity °API: 44.6
Total sulfur, wt %: 0.0081
Aniline pt, °F.: 163.9
Diesel index: 73
Cetane index: 59
Cloud pt, °F.: —4
Pour pt, °F.: —10
Vis., cSt @ 100° F.: 1.89
@ 212° F.: 0.88

Middle distillate
Range, °F.: 401-650
Yield, vol %: 25.8
Gravity, °API: 41.7
Total sulfur, wt %: 0.0191
Aniline pt, °F.: 176.8
Diesel index: 74
Cetane index: 65
Cloud pt, °F.: 38
Pour pt, °F.: 35
Vis., cSt @ 212° F.: 1.21

Gas oil
Range, °F.: 650-1,049
Yield, vol %: 34.7
Gravity, °API: 31.5
Total sulfur, wt %: 0.061
Aniline pt, °F.: 221.3
Con. carbon, wt %: 0.14
Pour pt, °F.: 105
Vis., cSt @ 212° F.: 5.03
V/Ni/Fe, wt ppm: 0.13/0.03/0.18

Residue
Range, °F.: 1,049+
Yield, vol %: 14.4
Gravity °API: 18.7
Total sulfur, wt %: 0.15
Con. carbon, wt %: 9.3
Vis., cSt @ 212° F.: 150
V/Ni/Fe, wt ppm: 0.95/4.20/16.50

Beryl, U.K. North Sea

SBM in producing area

Crude
Gravity, °API: 36.5
Kin. vis., cSt @ 59° F.: 9.47
Con. carbon residue, wt %: 1.3
Sulfur, wt %: 0.42
Rvp, psi: 5.2
V/Ni, ppm: 3.7/0.8
C_5 & lighter, vol %: 4.27

Naphtha
Range (TBP), °F.: 60-120
Yield, vol %: 2.29
Rvp, psi: 17.5
Paraffins, vol %: 97.5
Naphthenes, vol %: 2.5
Aromatics, vol %: 0.0
RON, clear: 80.5

Naphtha
Range, °F.: 120-330
Yield, vol %: 21.89
Sp gr, 60/60° F.: 0.7519
Rvp, psi: 2.5
P/N/A, vol %: 48.7/33.8/17.6
RON, clear: 61.4
RON + 3 ml TEL: 81.6
Sulfur, wt %: 0.0014
Nitrogen, ppm: 2.2

Kerosine
Range, °F.: 330-425
Yield, vol %: 10.70
Sp gr: 0.7976
P/N/A, vol %: 42.5/36.4/21.1
Sulfur, wt %: 0.0168

Light gas oil
Range, °F.: 425-650
Yield, vol %: 24.75
Sp gr: 0.8441
Gravity, °API: 36.1
Pour pt, °F.: 5
Aniline pt, °F.: 155.5
Diesel index: 56
Cetane index: 51
Sulfur, wt %: 0.21

Heavy gas oil
Range, °F.: 650-995
Yield, vol %: 25.89
Gravity, °API: 26.1
Sp gr: 0.8981
Pour pt, °F.: 95
Kin. vis., cSt @ 100° F.: 38.30
Aniline pt, °F.: 190.8
Total nitrogen, ppm: 1,317

Residue
Range, °F.: 995+
Yield, vol %: 12.95
Gravity, °API: 14.4
Sp gr, 60/60° F.: 0.9698
Pour pt, °F.: 120
Kin. vis., cSt @ 100° F.: 14,827.95
Sulfur, wt %: 1.04
Con. carbon, wt %: 8.80
V/Ni, ppm: 24.0/5.7

Residue
Range, °F.: 650+
Yield, vol %: 38.85
Gravity, °API: 22.0
Sp gr: 0.9220
Pour pt, °F.: 100
Kin. vis., cSt @ 100° F.: 190.47
Sulfur, wt %: 0.78
Total nitrogen, ppm: 2,258
Con. carbon, wt %: 3.14
V/Ni, ppm: 8.4/2.0

Brae, U.K. North Sea

Scheduled to join Forties system in mid 1983

Crude
Gravity, °API: 33.6
Sulfur, wt %: 0.73
Vis., cSt @ 10° C.: 13.6
Pour pt., °C.: —6
Carbon residue, wt %: 2.3
Asphaltenes, wt %: 0.35
V/Ni, ppm wt: 2.5/0.4
C_1—C_4, wt %: 2.15

Gasoline
Range (TBP), °C.: C_5—95
Yield, vol %: 9.25
Density @ 15° C., kg/l: 0.6985

Naphtha
Range, °C.: C_5—149
Yield, vol %: 21.45
Density @ 15° C., kg/l: 0.7405
Sulfur, wt %: 0.0005
P/N/A, wt %: 51.4/30.9/25.6

Kerosine
Range, °C.: 149-232
Yield, vol %: 15.2
Density @ 15° C., kg/l: 0.8125
Sulfur, wt %: 0.034
Aromatics, vol %: 25.7
Smoke pt, mm: 21
Cold test, °C.: —62
Aniline pt, °C.: 45.5
Diesel index: 49
Cetane index: 40

Gas oil
Range, °C.: 232-342
Yield, vol %: 21.3
Density @ 15° C., kg/l: 0.864
Sulfur, wt %: 0.55
Cloud pt, °C.: —15
Pour pt, °C.: —18
Acidity, mg KOH/g: 0.02
Aniline pt, °C.: 60.6
Diesel index: 45
Cetane index: 47

Residue
Range, °C.: 342+
Yield, vol %: 39.3
Density @ 15° C., kg/l: 0.9435
Sulfur, wt %: 1.41
Vis., cSt @ 50° C.: 128
Pour pt, °C.: 36
Carbon residue, wt %: 5.5
Asphaltenes, wt %: 0.75
V/Ni, ppm wt: 6.5/0.9

F.C.C. feed
Range, °C.: 369-509
Yield, vol %: 20.55
Density @ 15° C., kg/l: 0.921
Vis., cSt @ 100° C.: 7.22
Wax, wt %: 14
Aniline pt, °C.: 79.2

Note: Assay run on preproduction crude sample

Brent, U.K. North Sea

Brent system to Sullom Voe and SPAR in producing area

Crude
Gravity, °API @ 60° F.: 38.16
Sulfur, wt %: 0.26
Wax, wt %: 6.5
Pour pt (ASTM max.), °C.: —3
Kin. vis., @ 40° C., cSt: 3.72
H_2S existent potential, ppm: <1-1
Acid value, mg KOH/g (TAN): 0.05
Rvp, lb: 8.5
C_4—, vol %: 3.2

Gasoline
Range, °C.: C_5—85
Yield, vol %: 7.5
Sp gr @ 15° C.: 0.692
RON, clear: 71
RON + 0.5 g Pb/l Pb: 85

Naphtha
Range, °C.: 85-165
Yield, vol %: 17.7
Sp gr @ 15° C.: 0.769
Sulfur, wt %: 0.003
P/N/A, wt %: 42/34/24

Kerosine
Range, °C.: 165-235
Yield, vol %: 13.5
Sp gr @ 15° C.: 0.806
Sulfur, wt %: 0.01
Smoke pt, mm: 23
Aromatics, vol %: 21

Gas oil
Range, °C.: 235-300
Yield, vol %: 12.9
Sp gr @ 15° C.: 0.840
Sulfur, wt %: 0.05
Cetane index: 52
Cloud pt, °C.: —19

Gas oil
Range, °C.: 300-350
Yield, vol %: 9.2
Sp gr @ 15° C.: 0.860
Sulfur, wt %: 0.25
Cetane index: 57.5
Cloud pt, °C.: +6
Kin. vis., cSt @ 40° C.: 6.36

Residue
Range, °C.: 350+
Yield, vol %: 36.5
Sp gr @ 15° C.: 0.913
Sulfur, wt %: 0.55
Wax, wt %: 13
Pour pt, °C.: +36
Kin. vis., cSt @ 40° C.: 51.8
@ 100° C.: 13.5
Acid value 0.08
Asphaltenes, wt %: 0.05
V/Ni, ppm: 4/1.5

Note: This is assay of unblended Brent crude loaded at offshore SPAR.

Brent Blend, U.K. North Sea

Sullom Voe Terminal, Shetlands

Crude
Gravity, °API: 38.0
Vis., cSt @ 20° C.: 5.67
@ 37.8° C: 3.64
Pour pt, °C.: —15
Rvp, psig: 12.8
Sulfur, wt %: 0.38
Wax, wt %: 5.2
Asphaltenes, wt %: 0.26
V/Ni/Fe, ppm: 3.8/0.80/0.10

Light naphtha
Range, °C.: C_5—75
Yield, vol %: 6.2
Gravity, °API: 78.3
RON, clear: 72.0
Paraffins, wt %: 79.2
Olefins, wt %: Nil
Naphthenes, wt %: 16.8
Aromatics, wt %: 4.0

Naphtha
Range, °C.: C_5—165
Yield, vol %: 24.5
Gravity, °API: 60.1
Sulfur, ppm: 15
P/O/N/A, wt %: 59.0/Nil/33.0/8.0

Kerosine
Range, °C.: 165-235
Yield, vol %: 12.6
Gravity, °API: 45.0
Sulfur, wt %: 0.043
Smoke pt, mm: 26
Freeze pt, °C.: —56
Aromatics, vol %: 17.9

Gas oil
Range, °C.: 165-350
Yield, vol %: 33.3
Gravity, °API: 39.1
Sulfur, wt %: 0.14
Cetane index: 53.0
Pour pt, °C.: —21
Vis., cSt @ 37.8° C.: 2.37
@ 50° C.: 1.92
Aniline pt, °C.: 66.8

Gas oil
Range, °C.: 235-350
Yield, vol %: 20.7
Gravity, °API: 35.7
Sulfur, wt %: 0.19
Cetane index: 54.0
Pour pt, °C.: —12
Vis., cSt @ 37.8° C.: 3.79
@ 50° C.: 2.94
Aniline pt, °C.: 71.4

Vaccum gas oil
Range, °C.: 350-550
Yield, vol %: 28.3
Gravity, °API: 26.1
Sulfur, wt %: 0.57
Vis., cSt @ 100° F.: too waxy
Pour pt, °C.: +39
Con. carbon, wt %: 0.29
V/Ni/Fe, ppm: 0.05/0.02/0.14
UOP K factor: 12.3

Residue
Range, °C.: 550+
Yield, vol %: 10.3
Gravity, °API: 11.5
Sulfur, wt %: 1.35
Vis., cSt @ 37.8° C.: too waxy
Wax content, wt %: 10.1
Pour pt, °C.: +42
Con. carbon, wt %: 15.7
V/Ni/Fe, ppm: 25.5/7.0/0.96

Note: Analysis run on sample from tanker at Sullom Voe mid October 1981. Contributors to Brent Blend in early 1983 were North and South Cormorant, Brent, Dunlin, Thistle, and Murchison.

Buchan, U.K. North Sea

CALM in producing area

Crude
Gravity, °API: 33.7
Sulfur, wt %: 0.84
Vis., cSt @ 20° C.: 20.37
Pour pt, °C.: 6
Carbon residue, wt %: 5.0
Total C_1—C_4, yield, wt %: 1.50
V/Ni, ppm wt %: 19.4

Gasoline
Range (TBP), °C.: C_5—95
Yield, vol %: 9.45
Paraffins, wt %: 71.2
Naphthenes, wt %: 24.5
Aromatics, wt %: 4.3

Naphtha
Range, °C.: C_5—149
Yield, vol %: 19.9
Sulfur, wt %: 0.0009
P/N/A, wt %: 58.1/31.9/10.0

Kerosine
Range, °C.: 149-232
Yield, vol %: 14.45
Density @ 15° C., kg/l: 0.7965
Sulfur, wt %: 0.037
Aromatics, vol %: 18.8
Smoke pt, mm: 24
Aniline pt, °C.: 54.9
Diesel index: 60
Cetane index: 45

Gas oil
Range, °C.: 232-342
Yield, vol %: 20.55
Density @ 15° C., kg/l: 0.8465
Sulfur, wt %: 0.43
Vis., cSt @ 50° C.: 2.72
Pour pt, °C.: —15
Aniline pt, °C.: 68.0
Diesel index: 55
Cetane index: 54

Gas oil
Range, °C.: 342-369
Yield, vol %: 4.2
Sulfur, wt %: 0.93
Pour pt: °C.: 15
Aniline, pt, °C.: 74.9
Diesel index: 50
Cetane index: 57

Gas oil
Range, °C.: 369-509
Yield, vol %: 20.15
Density @ 15° C., kg/l: 0.9055
Sulfur, wt %: 1.06
Vis., cSt @ 60° C.: 21.1
@ 100° C.: 6.76
Wax, wt %: 12.5
Aniline pt, °C.: 84.6

Residue
Range, °C.: 342+
Yield, vol %: 43.25
Density @ 15° C., kg/l: 0.950
Sulfur, wt %: 1.56
Vis., cSt @ 50° C.: 304
Pour pt, °C.: 36
Carbon residue, wt %: 10.5
V/Ni, wt ppm: 39/8
V/Ni, wt ppm: (509+ °C.): 84/18
Sulfur, wt % (509+ °C.): 2.17

Cormorant, North, U.K. North Sea

Brent system to Sullom Voe

Crude
Gravity, °API: 34.9
Density @ 15° C., kg/l: 0.850
Sulfur, wt %: 0.71
Pour pt, °C.: +12
Kin. vis., @ 40° C., sq mm/sec: 5.76
Acid value, mg KOH/g (TAN): <0.05
C_4—, vol %: 2.6

Gasoline
Range, °C.: C_5—85
Yield, vol %: 7.0
Density @ 15° C.: 0.677
RON, clear: 69
RON + 0.5 g Pb/l: 84

Naphtha
Range, °C.: 85-165
Yield, vol %: 14.5
Density @ 15° C.: 0.759
Paraffins, wt %: 49
Naphthenes, wt %: 39
Aromatics, wt %: 20

Kerosine
Range, °C.: 165-235
Yield, vol %: 11.7
Density @ 15° C: 0.804
Sulfur, wt %: 0.04
Smoke pt, mm: 24
Aromatics, vol %: 20

Gas oil
Range, °C.: 235-300
Yield, vol %: 12.5
Density @ 15° C.: 0.837
Sulfur, wt %: 0.24
Cetane index: 53
Cloud pt, °C.: —23

Gas oil
Range, °C: 300-350
Yield, vol %: 9.4
Density @ 15° C.: 0.860
Sulfur, wt %: 0.56
Cetane index: 58
Cloud pt, °C.: +8
Kin. vis., @ 40° C., sq mm/sec: 5.92

Residue
Range, °C.: 350+
Yield, vol %: 42.7
Density @ 15° C.: 0.916
Sulfur, wt %: 0.56
Wax, wt %: 12
Pour pt, °C.: +36
Kin. vis., @ 60° C., sq mm/sec: 101
@ 100° C.: 20.0
Acid value: 0.05
Asphaltenes, wt %: 0.66
Con. carbon, wt %: 5.4
V/Ni, ppm: 23/11

Note: This was designated a provisional assay in early 1983.

Cormorant, South (Cormorant "A"), U.K. North Sea

Brent system to Sullom Voe

Crude
Gravity, °API: 35.7
Density @ 15° C. (kg/l): 0.846
Sulfur, wt %: 0.56
Pour pt, °C.: —6
Kin. vis., @ 40° C. sq mm/sec: 5.0
Acid value, mg KOH/g (TAN): 0.05
C_4—, vol %: 2.8

Gasoline
Range, °C.: C_5—85
Yield, vol %: 7.5
Density @ 15° C.: 0.679
RON, clear: 71
RON + 0.5 g Pb/l: 85

Naphtha
Range, °C.: 85-165
Yield, vol %: 15.4
Density @ 15° C.: 0.764
Sulfur, wt %: 0.001
Paraffins, wt %: 44
Naphthenes, wt %: 39
Aromatics, wt %: 17

Kerosine
Range, °C.: 165-235
Yield, vol %: 12.9
Density @ 15° C.: 0.806
Sulfur, wt %: 0.03
Smoke pt, mm: 21
Aromatics, vol %: 21

Gas oil
Range, °C.: 235-300
Yield, vol %: 13.4
Density @ 15° C.: 0.840
Sulfur, wt %: 0.16
Cetane index: 51.5
Cloud pt, °C.: —18

Gas oil
Range, °C.: 300-350
Yield, vol %: 7.9
Density @ 15° C.: 0.863
Sulfur, wt %: 0.49
Cetane index: 52
Cloud pt, °C.: +5
Kin. vis., @ 40° C., sq mm/sec: 6.27

Residue
Range, °C.: 350+
Yield, vol %: 40.5
Density @ 15° C.: 0.931
Sulfur, wt %: 1.06
Wax, wt %: 10
Pour pt, °C.: 36
Kin. vis., @ 60° C., sq mm/sec: 81.1
@ 100° C.: 16.1
Acid value: 0.1
Asphaltenes, wt %: 0.55
V/Ni, ppm: 3/21

Dan, Denmark North Sea

Contributor to Gorm Blend

Crude
Gravity, °API: 30.4
Sulfur, wt %: 0.34
Vis., cSt @ 40° C.: 8.90
Pour pt, °F.: <-45
C_4 & lighter, vol %: 0.8

Light gasoline
Range, °F.: C_5—200
Yield, vol %: 5.8%
Density, kg/l: 0.714
Sulfur, wt %: 0.002
RON, clear: 80.0

Naphtha
Range, °F.: 200-405
Yield, vol %: 20.3
Density, kg/l: 0.791
Sulfur, wt %: 0.05
RON, clear: 63.7

Light gas oil
Range, °F.: 405-650
Yield, vol %: 26.6
Density, kg/l: 0.868
Sulfur, wt %: 0.19
Pour pt, °F.: —45

Heavy gas oil
Range, °F.: 650-1,000
Yield, vol %: 30.0
Density, kg/l: 0.920
Sulfur, wt %: 0.42
Pour pt, °F.: 60
Vis., cSt @ 50° C.: 44.2

Atmospheric resid
Range, °F.: 650+
Yield, vol %: 46.5

Density, kg/l: 0.942
Sulfur, wt %: 0.55
Pour pt, °F: 45
Vis., cSt @ 50° C.: 269
Carbon residue, wt %: 5.0

Vacuum residue
Range, °F.: 1,000+
Yield, vol %: 16.5
Density, kg/l: 0.977
Sulfur, wt %: 0.70
Pour pt, °F: 100
Vis., cSt @ 100° C.: 326

Dunlin, U.K. North Sea

Brent system to Sullom Voe

Crude
Gravity, °API @ 60° F.: 34.9
Sulfur, wt %: 0.39
Wax, wt %: 5.0
Pour pt (ASTM max.), °C.: +6
Kin. vis., cSt @ 40° C.: 4.92
C_4—, vol %: 2.3

Gasoline
Range, °C.: C_5—85
Yield, vol %: 6.8
Sp gr @ 15° C.: 0.682
RON, clear: 69

Naphtha
Range, °C.: 85-165
Yield, vol %: 15.2
Sp gr @ 15° C.: 0.761
P/N/A, wt %: 42/43/15

Kerosine
Range, °C.: 165-235
Yield, vol %: 11.8
Sp gr @ 15° C.: 0.809
Sulfur, wt %: 0.025
Smoke pt, mm: 22
Aromatics, vol %: 21

Gas oil
Range, °C.: 235-300
Yield, vol %: 13.0
Sp gr @ 15° C.: 0.846
Sulfur, wt %: 0.13
Cetane index: 50
Cloud pt, °C.: —25

Gas oil
Range, °C.: 300-350
Yield, vol %: 10.0
Sp gr @ 15° C.: 0.864
Sulfur, wt %: 0.32
Cetane index: 56
Cloud pt, °C.: —1
Kin. vis., cSt @ 40° C.: 6.3

Residue
Range, °C.: 350+
Yield, vol %: 41.2
Sp gr @ 15° C.: 0.930
Sulfur, wt %: 0.74
Wax, wt %: 10
Pour pt, °C.: +33
Vis. kin., cSt @ 60° C.: 82.4
  @ 100° C.: 18.3
Acid value: 0.2
Asphaltenes, wt %: 0.24
V/Ni, ppm wt %: 5/2

Ekofisk, Norway North Sea

Seal Sands, Teesside, U.K. terminal

Crude
Gravity, °API: 43.4
Sulfur, wt %: 0.14
Pour pt, °F.: 10
Vis., SUS @ 70° F.: 36.1
Rvp, psig: 5.0
Yield, C_1—C_5, wt %: 6.43

Gasoline
Range, °F.: Ibp—176
Yield, vol %: 11.9
RON, clear: 66

Naphtha
Range, °F.: 176-302
Yield, vol %: 20.2
Gravity, °API: 57.9
Paraffins, vol %: 53.1
Naphthenes, vol %: 36.8
Aromatics, vol %: 10.1
Sulfur, ppm: 3

Kerosine
Range, °F.: 302-400
Yield, vol %: 10.6
Gravity, °API: 48.7
Total sulfur, wt %: 0.002
Aniline pt, °F.: 137
Smoke pt, °F.: 23
Freezing pt, °F.: —85

Gas oil
Range, °F.: 400-662
Yield, vol %: 23.4
Gravity, °API: 38.0
Vis., cSt @ 100° F.: 3.01
Pour pt, °F.: 0
Aromatics, vol %: 17
Total sulfur, wt %: 0.07
Aniline pt, °F.: 162
Diesel index: 62

Gas oil
Range, °F.: 302-707
Yield, vol %: 37.3
Gravity, °API: 40.2
Pour pt, °F.: 5

Heavy gas oil
Range, °F.: 707-977
Yield, vol %: 13.2
Gravity, °API: 25.0
Vis., cSt @ 122° F.: 34.05
Pour pt, °F.: 97
Total sulfur, wt %: 0.25
Con. carbon, wt %: 0.047
Aniline, °F.: 200.5
V/Ni/Fe, ppm: 0.8/0.3/0.3

Residue
Range, °F.: 707+
Yield, vol %: 25.2
Gravity, °API: 20.9
Vis., SUS @ 212° F.: 117.2
Pour pt, °F.: 97
Sulfur, wt %: 0.40
Con. carbon, wt %: 4.3
V/Ni/Fe, ppm: 0.4/5.7/1.2

Note: Seven fields contribute to the Ekofisk Blend, which this assay represents. They are Ekofisk, West Ekofisk, Cod (pure gas condensate), Tor, Eldfisk, Edda, and Albuskjell. Condensate is not included in gasoline and naphtha blends listed.

Flotta, U.K. North Sea

Flotta terminal, Orkney Islands

Crude
Gravity, °API: 35.7
Sulfur, wt %: 1.14
Vis., cSt @ 40° F.: 30.8
  @ 104° F.: 4.38
Pour pt, °F.: 21.0
C_4 & lighter, vol %: 4.3
Rvp @ 100° F., psi: 9.1

Naphtha
Range, °F.: C_5-149
Yield, vol %: 5.0
Sulfur, wt %: 0.001
Paraffins, vol %: 94.5
Naphthenes, vol %: 3.5
Aromatics, vol %: 1.5
RON, clear: 73.0
RON + 0.4 g Pb/l: 86.0
Rvp @ 100° F., psi: 18.2

Naphtha
Range, °F.: 149-302
Yield, vol %: 14.9
Gravity, °API: 59.9
Sulfur, wt %: 0.001
P/N/A, vol %: 66.0/27.5/16.0
RON, clear: 58.0

Naphtha
Range, °F.: 302-356
Yield, vol %: 5.6
Gravity, °API: 50.0
Sulfur, wt %: 0.04
Rvp @ 100° F., psi: 0.6
P/N/A, vol %: 49.5/30.5/19.5
Smoke pt, mm: 23
Freeze pt, °F.: −76

Kerosine
Range, °F.: 356-455
Yield, vol %: 8.0
Gravity, °API: 44.1
Sulfur, wt %: 0.11
Vis., cSt @ 104° F.: 1.23
Aromatics, vol %: 23.0
Smoke pt, mm: 20.5
Freeze pt, °F.: −48
Aniline pt, °F.: 129
Cloud pt, °F.: −66

Gas oil
Range, °F.: 455-572
Yield, vol %: 11.8
Gravity, °API: 37.0
Sulfur, wt %: 0.51
Vis., cSt @ 104° F.: 2.3
Aromatics, vol %: 28.0
Aniline pt, °F.: 141
Cloud pt, °F.: −10

Gas oil
Range, °F.: 572-650
Yield, vol %: 8.4
Gravity, °API: 32.5
Sulfur, wt %: 1.05
Vis., cSt @ 104° F: 4.78
Aromatics, vol %: 36.0
Aniline pt, °F.: 157
Cloud pt, °F.: 29

Gas oil
Range, °F.: 650-1,000
Yield, vol %: 28.5
Gravity, °API: 23.2
Sulfur, wt %: 1.69
Vis., cSt @ 122° F.: 25.8
Pour pt, °F.: 91
Aniline, pt °F.: 171
Con. carbon residue, wt %: 0.29
V/Ni/Fe, ppm: <1/1/2

Residue
Range, °F.: 650+
Yield, vol %: 42.0
Gravity, °API: 18.3
Sulfur wt %: 2.08
Vis., cSt @ 104° F.: 220
  @ 122° F.: 127
Pour pt, °F.: 86
Aniline pt °F.: 173
Con. carbon, wt %: 5.9
V/Ni/Fe: <3/7/3

Note: Flotta is a blend made up of Piper, Claymore, and Tartan crudes. Tartan appears in this section while Piper and Flotta (before introduction of Tartan) are in OGJ, Dec. 3, 1979, p. 102.

Forties, U.K. North Sea

Hound Point terminal, Firth of Forth

Crude
Gravity, °API: 36.6
Sulfur, wt %: 0.30
Vis., cSt @ 10° C.: 9.6
@ 21.1° C.: 6.81
Pour pt, °C.: −3
Wax, wt %: 7.0
Carbon residue, wt %: 2.2
Asphaltenes, wt %: 0.2
V/Ni, ppm wt: 3/2
Watson K factor: 11.9
C_1-C_4, wt %: 2.74

Gasoline
Range (TBP), °C.: C_5-95
Yield, vol %: 9.23
Sulfur, wt %: <0.001
RON, clear: 69.5
RON + 0.44 ml TEL/l: 83
P/N/A, wt %: 71.1/25.7/3.2

Naphtha
Range, °C.: C_5-149
Yield, vol %: 20.02
Density @ 15° C., kg/l: 0.723
Sulfur, wt %: <0.001
RON, clear: 62
RON + 0.44 ml TEL/l: 77.5
P/N/A, wt %: 54.9/35.8/9.3

Kerosine
Range, °C.: 149-232
Yield, vol %: 14.50
Density @ 15° C., kg/l: 0.7995
Sulfur, wt %: 0.010
Aromatics, vol %: 19.5
Smoke pt, mm: 24
Cold test, °C.: −58
Aniline pt, °C.: 54
Diesel index: 59
Cetane index: 44

Gas oil
Range, °C.: 232-342
Yield, vol %: 20.92
Density @ 15° C., kg/l: 0.852
Sulfur, wt %: 0.14
Vis., cSt @ 37.8° C.: 3.5
@ 50° C.: 2.7
Cloud pt, °C.: −15
Pour pt, °C.: −15
Aniline pt, °C.: 67
Diesel index: 53
Cetane index: 52

Residue
Range, °C.: 342+
Yield, vol %: 40.96
Density @ 15° C., kg/l: 0.9265
Sulfur, wt %: 0.61
@ 50° C.: 102
Pour pt, °C.: 33
Wax, wt %: 14.3
Carbon residue, wt %: 4.8
Asphaltenes, wt %: 0.5
V/Ni, ppm wt %: 7/4

FCC feed
Range, °C.: 369-509
Yield, vol %: 20.38
Density @ 15° C., kg/l: 0.9045
Sulfur, wt %: 0.44
Vis., cSt @ 37.8° C.: 45.6
Total nitrogen, ppm wt: 960
Aniline pt, °C.: 88

Note: Assay based on analyses of production crude samples obtained at rates of up to 400,000 b/d.

Fulmar, U.K. North Sea

SBM in producing area

Crude
Gravity, °API: 39.3
Density @ 15° C., kg/l: 0.828
Sulfur, wt %: 0.26
Pour pt, °C.: −12
Kin. vis., @ 40° C., sq mm/sec: 2.55
Acid value, mg KOH/g (TAN): 0.06
Yield C_4 −, vol %: 2.7

Gasoline
Range, °C.: C_5-85
Yield, vol %: 19.5
Density @ 15° C.: 0.666
RON, clear: 71
RON + 0.5 g Pb/l: 85

Naphtha
Range, °C.: 85-165
Yield, vol %: 19.5
Density @ 15° C.: 0.757
Sulfur, wt %: 0.001
Paraffins, wt %: 55
Naphthenes, wt %: 26
Aromatics: 19

Kerosine
Range, °C.: 165-235
Yield, vol %: 15.7
Density @ 15° C.: 0.804
Sulfur, wt %: 0.02
Smoke pt: 23
Aromatics, vol %: 23

Gas oil
Range, °C.: 235-300
Yield, vol %: 12.2
Density @ 15° C.: 0.839
Sulfur, wt %: 0.06
Cetane index: 51.5

Gas oil
Range, °C.: 300-350
Yield, vol %: 9.5
Density @ 15° C.: 0.856
Sulfur, wt %: 0.26
Cetane index: 60
Cloud pt, °C.: +3
Kin. vis., @ 40° C., sq mm/sec: 5.70

Residue
Range, °C.: 350+
Yield, vol %: 33.1
Density @ 15° C.: 0.916
Sulfur, wt %: 0.56
Pour pt, °C.: +33
Kin. vis., @ 60° C., sq mm/sec: 44.1
@ 100° C.: 11.3
Acid value: 0.08
Asphaltenes, wt %: 1.8
V/Ni, ppm: 5/1

Note: This has been designated a tentative assay.

Gorm, Denmark North Sea

SBM in producing area

Crude
Gravity, °API: 33.9
Sulfur, wt %: 0.23
Vis., cSt @ 40° C.: 5.44
Pour pt, °F.: −35
C_4 & lighter, vol %: 1.6

Light gasoline
Range, °F: C_5-300
Yield, vol %: 19.7
Density, kg/l: 0.729
Sulfur, wt %: 0.001
P/N/A vol %: 53/40/7

Naphtha
Range, °F.: 300-400
Yield, vol %: 10.0
Density, kg/l 0.800
Sulfur, wt %: 0.026
Smoke pt, mm: 23
Freezing pt, °F.: < −94
Aniline pt, °F.: 120
P/N/A vol %: 32/47/21

Kerosine
Range, °F.: 400-500
Yield, vol %: 12.1
Density, kg/l: 0.841
Sulfur, wt %: 0.065
Smoke pt, mm: 16
Freezing pt, °F.: −47
Cloud pt, °F.: −50
Pour pt, °F.: −60
Aniline pt, °F.: 134

Diesel oil
Range °F.: 500-650
Yield, vol %: 15.9
Density, kg/l: 0.865
Sulfur, wt %: 0.16
Cloud pt, °F.: 16
Pour pt, °F.: 20
Aniline pt., °F.: 155

Gas oil
Range, °F: 650-815
Yield, vol %: 15.0
Density, kg/l: 0.903
Sulfur, wt %: 0.30
Nitrogen, wt %: 0.08
Pour pt, °F.: 70
Aniline pt., °F.: 176
Vis., cSt @ 50° C.: 19.9

Heavy gas oil
Range, °F.: 815-1,000
Yield, vol %: 10.8
Density, kg/l: 0.924
Sulfur, wt %: 0.37
Nitrogen, wt %: 0.18
Pour pt, °F.: 100
Aniline pt, °F.: 196
Vis cSt @ 50° C.: 110

Residuum
Range, °F: 1,000+
Yield, vol %: 14.9
Density, kg/l: 0.972
Sulfur, wt %: 0.59
Nitrogen, wt %: 0.60
Hydrogen, wt %: 11.2
Carbon residue, wt %: 9.6
Vis., cSt @ 100° C.: 300
V/Ni, ppm: 65/40

Note: Subsequent to this assay Gorm has been joined by crude from Dan field (13% of blend in late 1982) and Skjold field (6% of blend). Skjold is marginal field. Dan has gravity of 30.4° API & sulfur content of 0.34 wt %.

Gullfaks, Norway North Sea

Block 34/10—Not yet in production

Crude
Gravity, °API: 28.6
Sp gr, 60/60: 0.8838
Sulfur, wt %: 0.44
Pour pt, °F.: −50
Vis., cSt @ 100° F.: 10.14

Gasoline
Range, °C.: 20-70
Yield, wt %: 0.8
Sp gr, 60/60: 0.6948
Sulfur, wt ppm: 100
RON, clear: 82.9

Paraffins, wt %: 66
Naphthenes, wt %: 32.1
Aromatics, wt %: 1.9

Gasoline
Range, °C.: 70-100
Yield, wt %: 2.6
Sp gr, 60/60: 0.7433
Sulfur, wt ppm: 500
P/N/A, wt %: 34.8/58.3/6.9

Gascline
Range, °C.: 100-150
Yield, wt %: 7.0
Sp gr, 60/60: 0.7808
Sulfur, wt %: 0.0023
P/N/A, wt %: 33/44.6/22.4
Yield, wt %: 7.0

Gasoline
Range °C.: 150-190
Yield, wt %: 6.6
Sp gr, 60/60: 0.8056
Sulfur, wt %: 0.0116
P/N/A, wt %: 42.5/32.3/25.2

Kerosine
Range, °C.: 150-205
Yield, wt %: 9.2
Sp gr, 60/60: 0.8108
Sulfur, wt %: 0.0148
Smoke pt, mm: 20
Diesel index: 48
Vis., cSt @ 100° F.: 1.03

Gas oil
Range, °C.: 205-343
Yield, wt %: 28.4
Sp gr, 60/60: 0.8676
Sulfur, wt %: 0.1935
Diesel index: 43
Vis., cSt @ 100° F.: 3.61

Residue
Range, °C.: 343+
Yield, wt %: 51.8
Gravity, °API: 19.3
Sp gr, 60/60: 0.9382
Sulfur, wt %: 0.77
Con. carbon, wt %: 3.8
Vis., cSt @ 100° F.: 351
Pour pt, °F.: 15

Note: This is a preliminary assay.

Magnus, U.K. North Sea

Ninian system to Sullom Voe (hookup slated mid 1983)

Crude
Gravity, °API: 39.3
Sulfur, wt %: 0.28
Pour pt, °C.: −3
Vis., cSt @ 21.1° C.: 4.56
Carbon residue, wt %: 1.6
V/Ni, ppm wt %: 4/2
Total C_1-C_4, wt %: 3.15

Gasoline
Range (TBP), °C.: C_5-95
Yield, wt %: 9.8

Naphtha
Range, °C.: 95-175
Yield, wt %: 16.75
P/N/A, wt %: 39.2/41.3/19.5

Naphtha
Range, °C.: C_5-149
Yield, wt %/vol %: 21.45/24.25
Density @ 15° C., kg/l: 0.733
Sulfur, wt %: 0.0015
P/N/A, wt %: 52.9/33.8/13.3

Kerosine
Range, °C.: 149-232
Yield, wt %/vol %: 15.0/15.5
Density @ 15° C., kg/l: 0.8015
Sulfur, wt %: 0.0085
Acidity, mg KOH/g: 0.03
Aromatics, vol %: 19.9
Cold test, °C.: −53.5
Aniline pt, °C.: 54.2
Cetane index: 44

Gas oil
Range, °C.: 232-342
Yield, wt %/vol %: 21.4/20.9
Density @ 15° C., kg/l: 0.8485
Sulfur, wt %: 0.15
Pour pt, °C.: −15
Acidity, mg KOH/g: 0.05
Aniline pt, °C.: 68.0
Diesel index: 54
Cetane index: 53

Gas oil
Range, °C.: 342-369
Yield, wt %/vol %: 4.4/4.15
Density @ 15° C., kg/l: 0.8755
Sulfur, wt %: 0.39
Vis., cSt @ 50° C.: 6.85
Pour pt, °C.: 12
Aniline pt, °C.: 77.1
Diesel index: 51
Cetane index: 58

Gas oil
Range, °C.: 369-509
Yield, wt %/vol %: 21.15/19.45
Density @ 15° C., kg/l: 0.8995
Sulfur, wt %: 0.43
Vis., cSt @ 98.9° C.: 6.27
Wax, wt %: 17.5
Aniline pt, °C.: 89.1

Residue
Range, °C.: 342+
Yield, wt %/vol %: 39.0/35.15
Density @ 15° C., kg/l: 0.918
Sulfur, wt %: 0.57
Vis., cSt @ 50° C.: 69
Carbon residue, wt %: 4.5
Asphaltenes, wt %: 0.35
V/Ni, ppm wt: 11/4

Residue
Range, °C.: 509+
Yield, wt %/vol %: 13.45/11.55
Density @ 15° C., kg/l: 0.965
Sulfur, wt %: 0.80
Vis., cSt @ 98.9° C.: 122
Carbon residue, wt %: 12.0
V/Ni, ppm wt %: 30/7

Note: Preliminary guide to Magnus, which was not in production when assay sample obtained.

Maureen, U.K. North Sea

Not yet in production. Production expected late 1983 or early 1984.

Crude
Gravity, °API @ 60° F.: 35.8/35.3*
Sulfur, wt %: 0.55
Pour test, °F.: +45
Vis., SUS @ 70° F.: 78.92/81.79*
C_4−, vol %: 2.6

Gasoline
Range, °F.: 60-200
Yield, vol %: 9.0
Sulfur, wt %: 0.002
RON, clear: 72.5
RON + 3 ml TEL/gal: 91.3

Naphtha
Range, °F.: 60-400
Yield, vol %: 27.9
P/N/A, vol %: 57.32/31.96/10.72
Sulfur, wt %: 0.002
RON, clear: 52.8
RON + 3 ml TEL/gal: 77.8

Kerosine
Range, °F.: 400-500
Yield, vol %: 12.3
Gravity, °API: 39.7
Vis., SUS @ 100° F.: 32.15
Freeze pt, °F.: −42
P/N/A, vol %: 37.8/40.1/22.1
Sulfur, wt %: 0.05
Aniline pt, °F.: 141.0
Smoke pt, mm: 20

Gas oil
Range, °F.: 500-650
Yield, vol %: 15.6
Gravity, °API: 34.0
Vis., SUS @ 100° F.: 42.34
Pour pt, °F.: +20
P/N/A, vol %: 34.3/39.8/25.9
Sulfur, wt %: 0.17
Aniline pt, °F.: 163.3
Cetane index: 55.5

Topped crude
Range, °F.: 650+
Yield, vol %: 41.6
Gravity, °API: 19.8
Vis., SUS @ 210° F.: 101.05
Pour pt, °F.: +90
Sulfur, wt %: 0.64
Rams. car. residue, wt %: 5.07
V/Ni, ppm: 9.5/4.5

Note: The inspection of fractions is based on composite of three drillstem test samples.
* Results from two samples.

Montrose, U.K. North Sea

SBM in producing area

Crude
Gravity, °API: 40.1
Sulfur, wt %: 0.23
Rvp, psi: 4.0
Pour pt, °F.: 15
Neut. no., mg KOH/g: 0.28
Rams. carbon, wt %: 1.3
Vis kin., cSt @ 68° F.: 4.96
@ 100° F.: 3.27
V/Ni, ppm: 2/2
C_4−, vol %: 2.2

Gasoline
Range (TBP), °F.: C_5-200
Yield, vol %: 12.3
Sulfur, wt %: 0.002
P/N/A, vol %: 70.0/27.1/2.9
RON, clear: 71.4
RON + 3 cc TEL/gal: 89.5

Naphtha
Range, °F.: 200-320
Yield, vol %: 15.0
Gravity, °API: 55.5
Sulfur, wt %: 0.001
Charac. factor: 11.84
P/N/A vol %: 56.2/33.5/10.3
RON, clear: 42.8
RON + 3 cc TEL/gal: 68.0

Kerosine
Range, °F.: 320-400
Yield, vol %: 8.9
Gravity, °API: 47.7
Sulfur, wt %: 0.005
Aniline pt, °F.: 137.7
Diesel index: 65.7

Cetane index: 45.1
Freeze pt, °F.: −75
Smoke pt, mm: 24

Gas oil
Range, °F.: 400-650
Yield, vol %: 25.4
Gravity, °API: 38.2
Sulfur, wt %: 0.082
Aniline pt, °F.: 161.1
Diesel index: 61.6
Cetane index: 55.1
Cloud pt, °F.: 10
Pour pt, °F.: 4
Vis., SUS @ 100° F.: 35.2
Total nitrogen, wt %: 0.009

Residue
Range, °F.: 650 +
Yield, vol %: 36.6
Gravity, °API: 23.7
Sulfur, wt %: 0.5
Pour pt, °F.: 80
Total nitrogen, wt %: 0.136
Rams. carbon, wt %: 3.3
Vis., SUS @ 122° F.: 334.6
@ 210° F.: 67.1
V/Ni, ppm: 4/4

Murchison, U.K. & Norway, North Sea

Brent system to Sullom Voe terminal

Crude
Gravity, °API: 38.0
Kin. vis., @ 100° F.: 3.60
Con. carbon residue, wt %: 1.1
Sulfur, wt %: 0.27
V/Ni, ppm: 2.5/0.7
Pour pt, °C.: −7.2
Rvp, psi: 9.0
C_3 & lighter, vol %: 3.0

Naphtha
Range (TBP), °F.: 86-375
Yield, vol %: 31.2
Paraffins, vol %: 55.5
Naphthenes, vol %: 32.8
Sulfur, wt %: < 0.01

Kerosine
Range, °F.: 375-520
Yield, vol %: 13.5
Gravity, °API: 42.2
Sulfur, wt %: 0.02
Aromatics, vol %: 17

Heavy distillate
Range, °F.: 520-700
Yield, vol %: 21.4
Gravity, °API: 34.1
Sulfur, wt %: 0.16

Gas oil
Range, °F.: 700-1,020
Yield, vol %: 21.0
Gravity, °API: 25.8
Sulfur, wt %: 0.43

Residue
Range, °F.: 1,020 +
Yield, vol %: 11.9
Gravity, °API: 13.7
Sulfur, wt %: 0.93
Kin. vis. @ 210° F.: 196
Con. carbon residue, wt %: 11.8
V/Ni, ppm: 18/5

Ninian Blend, U.K. North Sea

Ninian system to Sullom Voe terminal

Crude
Gravity °API: 35.6
Sulfur, wt %: 0.43
Vis., cSt @ 40° C.: 5.61
Pour pt, °F.: 35
C_4 & lighter, vol %: 2.6

Light gasoline
Range, °F.: C_5-300
Yield, vol %: 19.9
Density, kg/l: 0.726
Sulfur, wt %: 0.001
Paraffins, vol %: 63
Naphthenes, vol %: 27
Aromatics, vol %: 10

Naphtha
Range, °F.: 300-400
Yield, vol %: 9.3
Density kg/l: 0.788
Sulfur, wt %: 0.006
Smoke pt, mm: 27
Aniline pt, °F.: 128
P/N/A, vol %: 44/40/16

Kerosine
Range, °F.: 400-500
Yield, vol %: 11.1
Density, kg/l: 0.828
Sulfur, wt %: 0.047
Smoke pt, mm: 21
Freeze pt, °F.: −33
Cloud pt, °F.: −40
Pour pt, °F.: −40
Aniline pt, °F.: 143

Diesel oil
Range, °F.: 500-650
Yield, vol %: 14
Density, kg/l: 0.852
Sulfur, wt %: 0.23
Cloud pt, °F.: 20
Pour pt, °F.: 20
Aniline pt, °F.: 164

Gas oil
Range, °F.: 650-815
Yield, vol %: 13.1
Density, kg/l: 0.883
Sulfur, wt %: 0.46
Nitrogen, wt %: 0.05
Pour pt, °F.: 75
Aniline pt, °F: 184
Vis., cSt @ 50° C.: 10.7

Heavy gas oil
Range, °F.: 815-1,000
Yield, vol %: 14.0
Density, kg/l: 0.906
Sulfur, wt %: 0.60
Nitrogen, wt %: 0.10
Pour pt, °F: 110
Aniline pt, °F: 205
Vis., cSt @ 50° C.: 71.3

Residue
Range, °F.: 1,000 +
Yield, vol %: 16.0
Density, kg/l: 0.982
Sulfur, wt %: 1.2
Nitrogen, wt %: 0.40
Carbon residue, wt %: 11.7
Vis., cSt @ 100° C.: 291
V/Ni, ppm: 24/4

Note: This assay prepared when Heather field made up of 10% Ninian Blend. Magnus field is scheduled to contribute to Ninian system in mid 1983.

Statfjord, Norway & UK, North Sea

"A" and "B" SPM buoys in producing area

Crude
Gravity, °API: 38.4
Pour pt, °F.: 40
Kin. vis., @ 59° F.: 7.33
Con. carbon residue, wt %: 1.32
Sulfur, wt %: 0.27
Rvp, psi: 5.5
Total nitrogen, ppm: 1.03
V/Ni, ppm: 0.53/1.03
C_5 & lighter, vol %: 5.08

Naphtha
Range (TBP), °F.: 60-100
Yield, vol %: 6.49
Sp gr, 60° F./60° F.: 0.6740
Rvp, psi: 10.3
Paraffins, vol %: 80.1
Naphthenes, vol %: 17.8
Aromatics, vol %: 2.1

Naphtha
Range, °F.: 100-360
Yield, vol %: 22.12
Sp gr 0.7603
P/N/A: 48.9/37.3/13.8
RON, clear: 51.3
RON + 3 ml TEL: 74.2
Sulfur, wt %: 0.0037

Kerosine
Range, °F.: 360-503
Yield, vol %: 15.08
P/N/A, vol %: 48.1/34.6/17.2
Freeze pt, °F.: −47
Cloud pt, °F.: −52
Smoke pt, mm: 20
Aniline pt, °F: 142.1
Diesel index: 60
Cetane index: 49
Sulfur, wt %: 0.03

Light gas oil
Range, °F.: 503-710
Yield, vol %: 22.22
Sp gr, 60° F./60° F.: 0.8526
Gravity, °API: 34.5
Pour pt, °F.: 25
Aniline pt, °F.: 166

Heavy gas oil
Range, °F.: 710-946
Yield, vol %: 22.09
Gravity, °API: 25.6
Pour pt, °F.: 105
Kin. vis., cSt @ 100° F.: 66.27
Aniline pt, °F.: 200
Sulfur, wt %: 0.40
Basic nitrogen, ppm: 375
Con. carbon residue, wt %: 0.07

Residue
Range, °F.: 946 +
Yield, vol %: 9.84
Gravity, °API: 14.2
Pour pt, °F.: 120
Kin. vis., cSt @ 100° F.: 24,732.61
Sulfur, wt %: 0.74
Total nitrogen, ppm: 1,750
Con. carbon, wt %: 10.58
V/Ni, ppm: 8.1/5.7

Note: This assay is on production from Statfjord "A" platform. Statfjord "B" began operation in November 1982.

Tartan, U.K. North Sea

Flotta system

Crude
Gravity, °API: 41.7
Sulfur, wt %: 0.56
Vis., cSt @ 40° F.: 11.6
Pour pt, °F.: 16
C_4 & lighter, vol %: 3.5
Rvp @ 100° F., psi: 10.2

Naphtha
Range, °F.: C_5-149
Yield, vol %: 5.7
Sulfur, wt %: 0.001
Paraffins, vol %: 97.0
Naphthenes, vol %: 1.5
Aromatics, vol %: 1.0
RON, clear: 70.2

Naphtha
Range, °F.: 149-302
Yield, vol %: 20.0
Gravity, °API: 58.5
Sulfur, wt %: 0.01
P/N/A, vol %: 56.5/25.5/17.5
RON, clear: 56.6

Naphtha
Range, °F.: 302-356
Yield, vol %: 7.1
Gravity, °API: 49.4
Sulfur, wt %: 0.06
P/N/A, vol %: 50/30/19.5

Kerosine
Range, °F.: 356-455
Yield, vol %: 10.8
Gravity, °API: 44.0
Sulfur, wt %: 0.1
Aromatics, vol %: 23.5
Smoke pt, mm: 20
Freeze pt, °F.: −52
Aniline pt, °F.: 135

Gas oil
Range, °F.: 455-572
Yield, vol %: 12.3
Gravity, °API: 37.3
Sulfur, wt %: 0.32
Aromatics, vol %: 28.0
Aniline pt, °F.: 149

Gas oil
Range, °F.: 572-650
Yield, vol %: 8.3
Gravity, °API: 34.0
Sulfur, wt %: 0.64
Aromatics, vol %: 32.0
Aniline pt, °F.: 167

Residue
Range, °F.: 650+
Yield, vol %: 32.3
Gravity, °API: 23.1
Sulfur, wt %: 1.22
Vis., cSt @ 122° F.: 55.5
Con. carbon residue, wt %: 2.5
V/Ni/Fe, ppm: 6.0/2.0/4.0

Note: Tartan is part of Flotta Blend.

Thistle, U.K. North Sea

Brent system to Sullom Voe terminal

Crude
Gravity, °API: 37.03
Vis., cSt @ 20° C.: 5.87
@ 37.8° C.: 4.26
Pour pt, °C.: 12
Rvp, psig: 7.5
H_2S, wt %: <0.01
Acid no., mg KOH/g: <0.05
Sulfur, wt %: 0.31
Wax, wt %: 7.7
Asphaltenes, wt %: 0.19
C_4—, wt % on crude (GLC): 0.69

Gasoline
Range, °C.: C_5-85
Yield, vol %/wt %: 7.0/5.6
Density @ 15° C., g/cc: 0.6771
Sulfur, wt %: <0.01
RON, clear/0.5 g TEL per liter: 71.6/84.7
PO/N/A, wt %: 64.0/Nil/25/11.0

Naphtha
Range, °C.: 85-165
Yield, vol %/wt %: 16.6/15.0
Density @ 15° C., g/cc: 0.7547
Sulfur, wt %: <0.01
P/O/N/A, wt %: 44.5/Nil/42.9/12.6

Kerosine
Range, °C.: 165-235
Yield, vol %/wt %: 12.6/11.9
Density @ 15° C., g/cc: 0.7984
Sulfur, wt %: 0.02
Smoke pt, mm: 24
Freeze pt, °C.: −51
Aniline pt, °C.: 58.7
Aromatics, vol %: 15.0

Light gas oil
Range, °C.: 235-300
Yield, vol %/wt %: 12.9/12.9
Density @ 15° C., g/cc: 0.8393
Sulfur, wt %: 0.06
Vis., cSt @ 37.8° C.: 2.46
Cetane index: 49.5
Pour pt, °C.: −24
Cloud pt, °C.: −22
Aniline pt, °C.: 65.9
Con. car. residue (on 10% residue), wt %: 0.004

Heavy gas oil
Range, °C.: 300-350
Yield, vol %/wt %: 9.6/9.8
Density @ 15° C., g/cc: 0.8494
Sulfur, wt %: 0.21
Vis., cSt @ 37.8° C.: 5.47
Cetane index: 58.5
Pour pt, °C.: 0
Cloud pt, °C.: 1
Aniline pt, °C.: 77.9
Con. car. residue (on 10% residue), wt %: 0.039

Residue
Range, °C.: 350+
Yield, vol %/wt %: 39.8/43.8
Density @ 15° C., g/cc: 0.9217
Sulfur, wt %: 0.63
Vis., cSt @ 98.9° C.: 14.77
Pour pt, °C.: 39
Asphaltenes, wt %: 0.95
Con. car. residue, wt %: 4.6
V/Ni, ppm: 7.5/1.9
-30

West African

Bonny Light, Nigeria

Bonny shore terminal and Bonny marine SBM (12 miles offshore in Atlantic)

Crude
Gravity, °API: 36.7
Sulfur, wt %: 0.12
Salt, lb/1,000 bbl: 12
Wax, wt %: 7.5
Carbon residue, wt %: 1.0
V/Ni, ppm wt: <2/3
Vis., cSt @ 37.8° C.: 3.47
Yield C_1—C_4, wt %: 2.10

Naphtha
Range (TBP), °C.: C_5—149
Yield, vol %: 20.85
Sulfur, wt %: 0.002
Watson K factor: 12.2
RON, clear: 68.5
RON + 0.44 ml TEL/l: 81.5
Paraffins, wt %: 42.6
Naphthenes, wt %: 47.6
Aromatics, wt %: 9.8

Kerosine
Range, °C.: 149—232
Yield, vol %: 16.8
Sulfur, wt %: 0.020
Aromatics, vol %: 17
Smoke pt, mm: 21
Freeze pt, °C.: −61
Aniline pt, °C.: 53
Diesel index: 54
Cetane index: 39

Gas oil
Range, °C.: 232—342
Yield, vol %: 27.1
Sulfur, wt %: 0.10
Cloud pt, °C.: −11
Pour pt, °C.: −12
Wax, wt %: 5.5
Aniline pt, °C.: 67
Diesel index: 51
Cetane index: 49

Heavy gas oil
Range, °C.: 369—509
Yield, vol %: 19.6
Sulfur, wt %: 0.22
Vis., cSt @ 37.8° C.: 56.4
Pour pt, °C.: 39
Wax, wt %: 26
Total nitrogen, ppm wt: 1,180
Watson K factor: 11.9
Aniline pt, °C.: 86

Residue
Range, °C.: 342+
Yield, vol %: 32.6
Sulfur, wt %: 0.25
Vis., cSt @ 3.78° C.: 115
Pour pt, °C.: 39
Wax, wt %: 22
Total nitrogen, wt %: 0.24
Carbon residue, wt %: 2.7
V/Ni, ppm wt: 1/9
Watson K factor: 11.85

Note: Numerous fields contribute to Bonny Light and Medium blends, whose qualities are also influenced by national output. Analysis is on sample taken during period of high production.

Bonny Medium, Nigeria

Bonny shore terminal and Bonny marine CALM (12 miles offshore in Atlantic)

Crude
Gravity, °API: 25.2
Sulfur, wt %: 0.23
Vis., cSt @ 37.8 °C.: 12.1
Pour pt, °C.: −27
Carbon residue, wt %: 1.7
V/Ni, ppm wt: <1/7
C_1—C_4 yield, wt %: 0.52

Naphtha
Range (TBP), °C.: C_5—149
Yield, vol %: 6.31
Sulfur, wt %: 0.003
RON, clear: 73.5
RON + 0.44 ml TEL/l: 85.5
Paraffins, wt %: 32.8
Naphthenes, wt %: 54.7
Aromatics, wt %: 12.5

Kerosine
Range, °C.: 149—232
Yield, vol %: 12.85
Sulfur, wt %: 0.038
Aromatics, vol %: 16.5
Smoke pt, mm: 19
Freeze pt, °C.: < −70
Aniline pt, °C.: 49
Diesel index: 44
Cetane index: 32

Gas oil
Range, °C.: 232—343
Yield, vol %: 34.3
Density @ 15° C., kg/l: 0.889
Sulfur, wt %: 0.16
Vis., cSt @ 37.8 °C.: 4.7
Cloud pt, °C.: −32
Pour pt, °C.: −33
Aniline pt, °C.: 55
Diesel index: 36
Cetane index: 38

Heavy gas oil
Range, °C.: 369—509
Yield, vol %: 25.6
Density @ 15° C., kg/l: 0.9405
Sulfur, wt %: 0.31
Vis., cSt @ 37.8° C.: 162
Pour pt, °C.: 24
Total nitrogen, ppm wt: 1,790
Aniline pt, °C.: 72

Residue
Range, °C.: 342+
Yield, vol %: 45.95
Density @ 15° C., kg/l: 0.953
Sulfur, wt %: 0.37
Vis. @ 37.8 °C.: 515
Pour pt, °C.: 24
Carbon residue, wt %: 3.5
V/Ni, ppm wt: 2/15

Note: See note at end of Bonny Light assay.

Brass River, Nigeria

CALM some 12 miles off mouth of Brass

Crude
Gravity, °API @ 60° F.: 40.9
Sulfur, wt %: 0.09
Pour test, °F.: +35
Vis., SUS @ 70° F.: 38.66
Rvp, psi @ 100° F.: 6.9
Salt, lb/1,000 bbl: 3.8
V/Ni, ppm: 2.0/1.7
C_4 & lighter yield, vol %: 1.9

Gasoline
Range, °F.: 60—200
Yield, vol %: 11.2
Total sulfur, wt %: 0.001
RON, clear: 74.6
RON + 3 ml TEL/gal: 92.2
Rvp, psi: 12.4

Naphtha
Range, °F.: 200—300
Yield, vol %: 16.6
Paraffins, vol %: 44.97
Naphthenes, vol %: 43.52
Aromatics, vol %: 11.51
Total sulfur, wt %: <0.001

Naphtha
Range, °F.: 300—400
Yield, vol %: 11.5
P/N/A, vol %: 45.78/38.45/15.77
Total sulfur, wt %: 0.0087
Aniline pt, °F.: 128.0
Smoke pt, mm: 26

Kerosine
Range, °F.: 400-500
Yield, vol %: 16.9
Freezing pt, °F.: −36
P/N/A, vol %: 45.9/37.2/16.9
Total sulfur, wt %: <0.05
Aniline pt, °F.: 146.2
Smoke pt, mm: 20

Gas oil
Range, °F.: 500—650
Yield, vol %: 15.7
Gravity, °API: 33.9
Vis., SUS @ 100° F.: 41.41
Pour pt, °F.: +30
P/N/A, vol %: 47.0/32.1/20.9
Total sulfur, wt %: 0.06
Aniline pt, °F.: 167.2
Cetane index (determined): 57.4

Residue
Range, °F.: 650+
Yield, vol %: 26.5
Vis., SUS @ 210° F.: 53.55
Pour pt, °F.: +105
Total sulfur, wt %: 0.14
Rams. carbon residue, wt %: 2.31
V/Ni/Fe, ppm: 6.6/5.7/5.8

Heavy gas oil
Range (vac. flash), °F.: 625—1,100
Yield, vol %: 24.7
Aniline pt, F.: 190.1
Vis., SUS @ 130° F.: 127.55
Pour pt, °F.: +105
Sulfur, wt %: 0.33
Rams. carbon res., wt %: 0.67
V/Ni/Fe, ppm: 0.2/1.2/<0.2
Nitrogen, wt %: 0.139

Cabinda, Angola

CALM in producing area off Malongo terminal, Cabinda

Crude
Gravity, °API: 31.7
Sulfur, wt %: 0.17
Vis., SUS @ 100° F.: 93.5
Pour pt, °F.: +65
C_4 & lighter, vol %: 1.58
Rvp, psi: 3.8
V/Ni, ppm: 2.4/15.9
Salt, lb/1,000 bbl: 18
ASTM, 50% pt, °F.: >590

Light naphtha
Range (TBP), °F.: Ibp—140*
Yield, vol %: 2.18
Sulfur, wt %: 0.024
RON, clear: 77.3

Light naphtha
Range, °F.: 140—170
Yield, vol %: 1.67
Sulfur, wt %: 0.018
Paraffins, vol %: 77.6
Naphthenes, vol %: 21.4
Aromatics, vol %: 1.0
RON, clear: 65.1

Heavy naphtha
Range, °F.; 170—310
Yield, vol %: 9.98
Sulfur, wt %: 0.06
P/N/A, vol %: 50.0/44.8/5.2
Aniline pt, °F.: 134.4

Kerosine
Range, °F.: 310—520
Yield, vol %: 16.27
Gravity, °API: 43.7
Sulfur, wt %: 0.08
Freezing pt, °F.: −42
Aniline pt, °F.: 148.5
Cetane index: 50.8
Smoke pt, mm: 25

Light gas oil
Range, °F.: 520—680
Yield, vol %: 15.83
Gravity, °API: 34.9
Vis., SUS @ 100° F.: 44.4
Sulfur, wt %: 0.14
Pour pt, °F.: +35
Diesel index: 61.2
Cetane index: 60.5

Heavy gas oil
Range (TBP to EFV), °F.: 680—1,000
Yield, vol %: 29.34
Gravity, °API: 25.8
Vis., SUS @ 210° F.: 55.6
Sulfur, wt %: 0.16
Total nitrogen, ppm: 1,400
Pour pt, °F.: +115
Aniline pt, °F.: 210.2
V/Ni, ppm: >0.1/0.4

Residual oil
Range, °F.: 680+
Yield, vol %: 52.87
Gravity, °API: 20.4
Vis., SUS @ 210° F.: 210
Sulfur, wt %: 0.24
Con. carbon res., wt %: 5.82
Pour pt, °F.: +95
V/Ni, ppm: 4.2/28

*Does not include C_4 and lighter

Djeno Blend, Congo (Brazzaville)

CALM located 3.8 km from Djeno tank farm

Crude
Gravity, °API: 26.87
Vis., cSt @ 10° C.: 220
Pour pt, °C.: +3
Rvp @ 37.8° C., g/sq cm: 290
Total sulfur, wt %: 0.33
Acidity, mg KOH/g: 1.10
UOP charac. factor: 12.0
V/Ni, kg/mg: <1/23
Yield C—C_5, vol %: 2.37

Gasoline
Range, °C.: 15—80
Yield, vol %: 2.59
RON, clear: 69.0
Sulfur, wt %: 0.0876
Aromatics, vol %: 1.3

Naphtha
Range, °C.: 80—180
Yield, vol %: 11.86
Paraffins, vol %: 52.5
Naphthenes, vol %: 39.8
Aromatics, vol %: 7.7
Sulfur, wt %: 0.16

Kerosine
Range, °C.: 180—225
Yield, vol %: 5.90
Freezing pt, °C.: −51
Smoke pt, mm: 20
Sulfur, wt %: 0.20
Aromatics, vol %: 12.5

Gas oil
Range, °C.: 225—350
Yield, vol %: 21.88
Pour pt, °C.: −10
Cloud pt, °C.: −7
Sulfur, wt %: 0.17

Heavy gas oil
Range, °C.: 400—550
Yield, vol %: 21.88
Density 15/4 °C.: 0.926
Pour pt, °C.: +39
Vis., cSt @ 50° C.: 185
V/Ni, ppm: <0.5/<1
Sulfur, wt %: 0.25
Nitrogen, pm: 944
Aniline pt, °C.: 95.7
Con. carbon residue, wt %: 0.60

Residue
Range, °C.: 350+
Yield, vol %: 57.42
Density, 15/4 °C.: 0.952
Pour pt, °C.: +30
Vis., cSt @ 50° C.: 1,850
Sulfur, wt %: 0.41

Escravos, Nigeria

CALM in offshore producing area

Crude
Gravity, °API: 36.2
Sulfur, wt %: 0.14
Vis., SUS @ 100° F.: 37.6
Pour pt, °F.: +10
C_4 & lighter, vol %: 2.24
Rvp, lb: 4.3
V/Ni, ppm: 0.3/3.8
Salt, lb/1,000 bbl: 1
Uncondensed gases, vol %: 1.95

Light naphtha
Range (TBP), °F.: Ibp—140
Yield, vol %: 2.82
Gravity, °API: 88.0
Sulfur, wt %: 0.015
RON, clear: 82.6

Light naphtha
Range (TBP), °F.: 140—170
Yield, vol %: 1.60
Gravity, °API: 74.5
Sulfur, wt %: 0.009
P/N/A, vol %: 72.0/24.6/3.4
RON, clear: 75.0

Heavy naphtha
Range (TBP), °F.: 170—310
Yield, vol %: 16.13
Gravity, °API: 55.6
Sulfur, wt %: 0.013
P/N/A, vol %: 41.6/46.5/11.9
Aniline pt, °F.: 113.9

Kerosine
Range (TBP), °F.: 310—520
Yield, vol %: 28.55
Gravity, °API: 39.5
Sulfur, wt %: 0.06
Freezing pt, °F.: −51
Aniline pt, °F.: 131.4
Cetane index: 38.5
Smoke pt (ASTM), mm: 15

Light gas oil
Range (TBP), °F.: 520—680
Yield, vol %: 19.17
Gravity, °API: 31.1
Vis., SUS @ 100° F.: 44.9
Sulfur, wt %: 0.19
Pour pt, °F.: +30
Diesel index: 49.9
Cetane index: 47.0

Heavy gas oil
Range (TBP or EFV), °F.: 680—1,000
Yield, vol %: 23.76
Gravity, °API: 22.4
Vis., SUS @ 210° F.: 56.1
Sulfur, wt %: 0.22
Nitrogen (total), ppm: 1,700
Pour pt, °F.: +120
Aniline pt, °F.: 190.0
V/Ni, ppm: >0.1/0.9

Residual oil
Range (TBP or EFV), °F.: 680+
Yield, vol %: 29.78
Gravity, °API: 19.9
Vis., SUS @ 210° F.: 93.5
Sulfur, wt %: 0.27
Con. carbon residue, wt %: 3.72
Pour pt, °F.: +115
V/Ni, ppm: 1.0/11.5

Espoir, Ivory Coast

CALM yoke with permanent floating storage in producing area

Crude
Gravity, °API: 31.4
Sp gr @ 60° F.: 0.8686
Sulfur, wt %: 0.32
Pour test, °F.: +5
Vis., SUS @ 70° F.: 69.78
Rvp @ 100° F., psi: 5.5
Salt lb/1,000 bbl: 15.0
Yield, NC_4 & lighter, vol %: 0.8
V/Ni, ppm: 1.7/5.8

Gasoline
Range, °F.: 60—200
Yield, vol %: 4.5
Total sulfur, wt %: <0.001
RON, clear (calc.): 73.6

Naphtha
Range, °F.: 200—300
Yield, vol %: 10.9
Total sulfur, wt %: 0.0049
Aniline pt, °F.: 118.5

Naphtha
Range, °F.: 300—400
Yield, vol %: 9.4
Paraffins, vol %: 43.42
Naphthenes, vol %: 48.19
Aromatics, vol %: 8.39
Total sulfur, wt %: 0.036
Aniline pt, °F.: 121.5
Smoke pt, mm: 25

Kerosine
Range, °F.: 400—500
Gravity, °API: 36.1
Vis., SUS @ 100° F.: 32.84
Freezing pt, °F.: −56
P/N/A, vol %: 26.3/50.9/22.8
Sulfur, wt %: 0.07
Aniline pt, °F.: 136.1
Smoke pt, mm: 19

Light gas oil
Range, °F.: 500—650
Yield, vol %: 17.1
Gravity, °API: 30.7
Vis., SUS @ 100° F.: 45.28
Pour pt, °F.: +10
P/N/A, vol %: 28.3/49.8/21.9
Total sulfur, wt %: 0.22
Aniline pt, °F.: 157.4

Vacuum gas oil
Range, °F.: 620—1,000
Yield, vol %: 25.7
Gravity, °API: 23.3
Aniline pt, °F.: 192.1
Vis., SUS @ 130° F.: 152.01
Pour pt, °F.: +90
Sulfur, wt %: 0.39
Rams. carbon res., wt %: 0.15
V/Ni, ppm: 0.1/0.2
Nitrogen, wt %: 0.086

Residue
Range, °F.: 650+
Yield, vol %: 42.9
Vis., SUS @ 210° F.: 125.43
Pour pt, °F.: +80
Total sulfur, wt %: 0.565
Rams. carbon res., wt %: 3.69
Nitrogen, wt %: 0.225
V/Ni, ppm: 3.8/12.6

Forcados Blend, Nigeria

CALMS some 7 miles off coast

Crude
Gravity, °API: 29.7
Sulfur, wt %: 0.29
Pour pt, °C.: −20
Kin. vis., cSt @ 10° C.: 10.6
C_4 & lighter: 0.7

Light naphtha
Range, °C.: C_5—65
Yield, wt %: 1.4
Density @ 15° C., g/cu cm: 0.650
RON + 0.4 g Pb/l: 87.5

Heavy naphtha
Range, °C.: 65—175
Yield, wt %: 12.3
Density @ 15° C., g/cu cm: 0.765
RON + 0.4 g Pb/l: 75
Aromatics, vol %: 12.0
Naphthenes, vol %: 53

Kerosine
Range, °C.: 175—225
Yield, wt %: 9.0
Density @ 15° C., g/cu cm: 0.830
Sulfur, wt %: 0.04

Gas oil
Range, °C.: 225—360
Yield, wt %: 37.8
Density @ 15° C., g/cu cm: 0.880
Sulfur, wt %: 0.18
Pour pt, °C.: −17
Cold filter pour pt, °C.: −15
Kin. vis., cSt @ 100° C.: 1.46

Heavy gas oil
Range, °C.: 360—525
Yield, wt %: 28.6
Density @ 15° C.: 0.941
Sulfur, wt %: 0.40
Kin. vis., cSt @ 100° C.: 10.6

Residue
Range, °C.: 360+
Yield, wt %: 38.8
Density @ 15° C.: 0.953
Sulfur, wt %: 0.56
Kin. vis., cSt @ 100° C.: 22.1

Gamba, Gabon

Buoy 6 km offshore from Gamba tank farm

Crude
Gravity, °API: 31.8
Vis., cSt @ 37.8° C.: 36.7
Pour pt, °C.: +23
Total sulfur, wt %: 0.11
Con. carbon, wt %: 3.10
UOP charac. factor: 12.20
Yield C_1—C_5, vol %: 1.42

Gasoline
Range, °C.: C_5—80
Yield, vol %: 1.3
Rvp, psi, g/sq cm: 800
RON, clear: 90
Sulfur, wt %: 0.0036

Heavy naphtha
Range, °C.: 80—160
Yield, vol %: 4.9
Density @ 15/4 °C.: 0.753
Paraffins, vol %: 46.9
Naphthenes, vol %: 50.6
Aromatics, vol %: 2.5
Sulfur, wt %: 0.0069

Kerosine
Range, °C.: 160—250
Yield, vol %: 11.8
Density @ 15/4 °C.: 0.808
Freezing pt, °C.: −52
Smoke pt, mm: 23
Sulfur, wt %: 0.014
Aniline pt, °C.: 64.2
Aromatics, vol %: 14.0

Gas oil
Range, °C.: 250—350
Yield, vol %: 19.3
Density @ 15/4 °C.: 0.838
Pour pt, °C.: −14
Cloud pt, °C.: −11
Vis., °Engler @ 20° C.: 1.58
Cetane index: 53
Sulfur, wt %: 0.057
Diesel index: 66
Aniline pt, °C.: 80.4

Residue
Range, °C.: +350
Yield, vol %: 62.0
Density @ 15/4 °C.: 0.900
Pour pt., °C.: +45
Vis., °Engler @ 50° C.: 18.9
Sulfur, wt %: 0.16

Kole Marine Blend, Cameroon

CALM with floating storage in offshore producing area

Crude
Gravity, °API: 34.89
Vis., cSt @ 10° C.: 11.1
Pour pt, °C.: −6
Total sulfur, wt %: 0.30
Rvp @ 37.8° C., g/sq cm: 445
Paraffins, wt %: 6.2
Con. carbon, wt %: 3.65
UOP charac. factor: 11.9
V/Ni, kg/mg: 9/27
C_1—C_5, yield, vol %: 6.12

Light gasoline
Range, °C.: 15—80
Yield, vol %: 5.71
RON, clear: 76.2

Heavy naphtha
Range, °C.: 80—180
Yield, vol %: 21.89
Density, 15/4 °C.: 0.765
Paraffins, vol %: 38.5
Naphthenes, vol %: 53.3
Aromatics, vol %: 8.2
Sulfur, wt %: 0.0080

Kerosine
Range, °C.: 180—225
Yield, vol %: 8.21
Density @ 15/4 °C.: 0.819
Freeze pt, °C.: −63
Smoke pt, mm: 20
Sulfur, wt %: 0.0467
Aromatics, vol %: 13.4

Gas oil
Range, °C.: 150—400
Yield, vol %: 43.89
Density @ 15/4 °C.: 0.839
Pour pt, °C.: −9
Vis., cSt @ 50° C.: 2.6
Cetane index: 52.0
Sulfur, wt %: 0.16

Gas oil
Range, °C.: 180—350
Yield, vol %: 30.46
Density @ 15/4 °C.: 0.838
Pour pt, °C.: −22
Sulfur, wt %: 0.15

Residue
Range, °C.: 350+
Yield, vol %: 38.91
Density @ 15/4 °C.: 0.947
V/Ni, ppm: 20/68
Pour pt, °C.: +33
Vis. @ 50° C.: 425
Ash, wt %: 0.05
Sulfur, wt %: 0.54

Lucina Marine, Gabon

CALM with floating storage in offshore producing area

Crude
Gravity, °API: 39.52
Vis., cSt @ 20° C.: 16.00
Pour pt, °C.: +15
Rvp @ 37.8° C., g/sq cm: 450
Total sulfur, wt %: 0.05
Asphaltenes, wt %: 0.06
UOP charac. factor: 12.25
V/Ni, kg/mg: 1.3/12.2

Gasoline
Range, °C.: C_5—80
Yield, vol %: 5.56
Rvp, g/sq cm: 698
RON, clear: 66.3

Heavy gasoline
Range, °C.: 80—150
Yield, vol %: 13.46
Paraffins, vol %: 54.3
Naphthenes, vol %: 37.8
Aromatics, vol %: 7.9
Sulfur, wt %: 0.005

Kerosine
Range, °C.: 150—225
Yield, vol %: 14.38
Density @ 15/4 °C.: 0.778
Freeze pt, °C.: −55
Vis., cSt @ 34.4° C.: 5.07
Smoke pt, mm: 21
Sulfur, wt %: 0.006
Aromatics, vol %: 10.6

Gas oil
Range, °C.: 150—350
Yield, vol %: 38.59
Density @ 15/4 °C.: 0.809
Pour pt, °C.: −18
Vis., °Engler @ 50° C.: 1.78
Cetane index: 60.0
Diesel index: 71.8
Sulfur, wt %: 0.010
Aniline pt, °C.: 74.2

Residue
Range, °C.: 350+
Yield, vol %: 40.23
Density @ 15/4 °C.: 0.898
Pour pt, °C.: +36
Vis., cSt @ 50° C.: 86.4
Sulfur, wt %: 0.060
Asphaltenes, wt %: 0.08
Con. carbon, wt %: 2.96
V, ppm: 3

Mandji, Gabon

Cap Lopez terminal, loading berth, Prince's Bay

Crude
Gravity, °API: 30.5
Vis., cSt @ 10° C.,: 44.0
Pour pt, °C.: +3
Rvp @ 37.8° C., g/sq cm: 270
Total sulfur, wt %: 1.10
Asphaltenes, wt %: 0.3
Con. carbon, wt %: 5.40
UOP charac. factor: 12.1
V/Ni, kg/mg: 48/50
C_1—C_5, yield, vol %: 4.46

Gasoline
Range, °C.: 15—80
Yield, vol %: 5.38
RON, clear: 74.2

Heavy naphtha
Range, °C.: 80—150
Yield, vol %: 9.63
Paraffins, vol %: 55.2
Naphthenes, vol %: 36.7
Aromatics, vol %: 8.1
Sulfur, wt %: 0.006

Kerosine
Range, °C.: 150—225
Yield, vol %: 10.37
Density @ 15/4 °C.: 0.795
Freeze pt, °C.: −53
Smoke pt, mm: 24
Sulfur, wt %: 0.101
Aromatics, vol %: 17.3
Aniline pt, °C.: 56.1

Gas oil
Range, °C.: 150—375
Yield, vol %: 36.12
Density @ 15/4 °C.: 0.839
Pour pt, °C.: −15
Vis., cSt @ 50° C.: 2.28
Cetane index: 55.1
Diesel index: 59.7
Sulfur, wt %: 0.4
Aniline pt, °C.: 69.3

Heavy gas oil
Range, °C.: 375—525
Yield, vol %: 23.10
Density @ 15/4 °C.: 0.909
Pour pt, °C.: +37
Vis., cSt @ 50° C.: 50
Nitrogen, ppm: 480
Aniline pt, °C.: 85.4
Ni, ppm: <1
Sulfur, wt %: 1.14
Con. carbon, wt %: 0.45

Residue
Range, °C.: 37[illegible]+
Yield, vol %: 46.96
Density @ 15/4 °C.: 0.952
V/Ni, ppm: 93/98
Pour pt, °C.: +36
Vis., cSt @ 50° C.: 2,100
Sulfur, wt %: 1.81
Asphaltenes, wt %: 0.49
Con. carbon, wt %: 10.2

Pennington, Nigeria

CALM with export from floating storage in offshore producing area

Crude
Gravity, °API: 36.6
Sulfur, wt %: 0.07

Vis., cSt @ 104° F.: 3.06
Pour pt, °F.: 43
C_4 & lighter, vol %: 1.5
Rvp @ 100° F., psi: 5.1
Con. carbon residue, wt %: 0.7
V/Ni, ppm: 2/1

Light naphtha
Range, °F.: C_5—200
Yield, vol %: 7.4
Sulfur, wt %: 0.001
Paraffins, vol %: 70.5
Naphthenes, vol %: 25.5
Aromatics, vol %: 3.5
RON, clear: 74.9

Heavy naphtha
Range, °F.: 200—340
Yield, vol %: 14.7
Sulfur, wt %: 0.001
P/N/A, vol %: 35.0/52.5/12.0
RON, clear: 55.5
Aniline pt, °F.: 118

Kerosine
Range, °F.: 340—470
Yield, vol %: 18.0
Gravity, °API: 40.6
Sulfur, wt %: 0.02
Vis., cSt @ 104° F.: 1.45
Smoke pt, mm: 19.5
Freeze pt, °F.: −69
Aniline pt, °F.: 135
Cloud pt, °F. < −76

Gas oil
Range, °F.: 470—650
Yield, vol %: 31.7
Gravity, °API: 33.7
Sulfur, wt %: 0.05
Vis., cSt @ 104° F.: 3.72
Pour pt, °F. −1.0
Aniline pt, °F.: 158
Cloud pt, °F.: 6.0

Vacuum gas oil
Range, °F.: 650—1,000
Yield, vol %: 23.4
Gravity, °API: 23.5
Sulfur, wt %: 0.15
Vis., cSt @ 122° F.: 28.9
Pour pt, °F.: 102
Aniline pt, °F.: 184
Con. carbon residue, wt %: 0.12
V/Ni, ppm: 2/<1

Residue
Range, °F.: 650+
Yield, vol %: 26.7
Gravity, °API: 21.8
Sulfur, wt %: 0.17
Vis., cSt @ 122° F.: 48.5
Pour pt, °F.: 91
Aniline pt, °F.: 179
Con. carbon residue, wt %: 2.3

Qua Iboe, Nigeria

CALM in offshore producing area

Crude
Gravity, °API: 35.8
Pour pt, °F.: 45
Kin. vis., cSt @ 59° F.: 6.76
@ 104° F.: 3.39
Con. carbon residue, wt %: 0.92
Aniline pt, °C.: 62.56
Sulfur, wt %: 0.12
Rvp, psi: 6.0
Nitrogen, total, ppm: 540
V/Ni, ppm: 0.3/3.3
C_5 & lighter, yield, vol %: 5.13

Light naphtha
Range (TBP), °F.: 60—180
Yield, vol %: 5.15
Rvp, psi: 10.3
Paraffins, vol %: 67.3
Naphthenes, vol %: 31.6
Aromatics, vol %: 1.1
Sulfur, wt %: 0.0008

Heavy naphtha
Range, °F.: 180—380
Yield, vol %: 25.14
Rvp, psi: 1.0
P/N/A, vol %: 34.6/55.3/10.1
RON, clear: 56.6
RON + 3 ml TEL/gal: 76.0
Sulfur, wt %: 0.026

Kerosine
Range, °F.: 330—444
Yield, vol %: 13.64
Gravity, °API: 41.2
P/N/A, vol %: 36.4/49.3/14.3
Freezing pt, °F.: −50
Smoke pt, mm: 20
Aniline pt, °F.: 132.1
Diesel index: 54
Cetane index: 39
Sulfur, wt %: 0.05

Light gas oil
Range, °F.: 380—710
Yield, vol %: 42.63
Gravity, °API: 33.1
Pour pt, °F: 15
Aniline pt, °F.: 151.4
Sulfur, wt %: 0.11

Heavy gas oil
Range, °F.: 710—850
Yield, vol %: 12.18
Gravity, °API: 22.7
Pour pt, °F.: 95
Kin. vis., cSt @ 100° F.: 68.55
Aniline pt, °F.: 178.7
Diesel index: 41
Sulfur, wt %: 0.16
Nitrogen, total, ppm: 679
Con. carbon, wt %: 0.02

Residue
Range, °F.: 710+
Yield, vol %: 24.65
Gravity, °F.: 17.9
Pour pt, °F.: 110
Kin. vis., cSt @ 100° F.: 900.93
Sulfur, wt %: 0.23
Nitrogen, total, ppm: 1,604
Con. carbon residue, wt %: 3.36
V/Ni, ppm: 1.2/13.1

Salt Pond, Ghana

SALM with hawser-moored permanent storage in offshore producing area

Crude
Gravity, °API: 37.4
Sulfur, wt %: 0.097
C_1—C_3 yield, vol %: 0.37

Gasoline
Range, °F.: 115—180
Yield, vol %: 9.23
RON, clear: 57.0

Gasoline
Range, °F.: 180—220
Yield, vol %: 2.90
RON, clear: 51.0

Naphtha
Range, °F.: 220—250
Yield, vol %: 2.50
RON, clear: 46.5

Naphtha
Range, °F.: 250—320
Yield, vol %: 7.20

Heavy naphtha
Range, °F.: 320—360
Yield, vol %: 4.30
Aniline pt, °F.: 138

Kerosine
Range, °F.: 360—500
Yield, vol %: 16.30
Gravity, °API: 43.7
Pour pt, °F.: −36
Sulfur, wt %: 0.020
Aniline pt, °F.: 148

Gas oil
Range, °F.: 500—600
Yield, vol %: 10.90
Gravity, °API: 37.3
Pour pt, °F.: 11
Sulfur, wt %: 0.030
Aniline pt, °F.: 163

Gas oil
Range, °F.: 600—650
Yield, vol %: 5.10
Gravity, °API: 34.4
Pour pt, °F.: 38
Sulfur, wt %: 0.070
Aniline pt, °F.: 173

Heavy gas oil
Range, °F.: 650—940
Yield, vol %: 21.20
Gravity, °API: 27.9
Sulfur, wt %: 0.110
Nitrogen, %: 0.0300

Vacuum bottoms
Range, °F.: 940+
Yield, vol %: 20.00
Gravity, °API: 17.6
Sulfur, wt %: 0.250
K factor: 11.89
Vis., Sfs @ 210° F.: 263.0

Soyo Blend, Angola

Quinfequena terminal

Crude
Gravity, °API: 33.7
Sulfur, wt %: 0.23
Pour pt, °C.: +18
Vis., cSt @ 37.8° C.: 10.08
Asphaltenes, wt %: 0.72
Total acidity, mg KOH/g: 0.07
Wax content, wt % @ —30° C.: 14.7
V/Ni, ppm: 5/15
C_1—C_5 (GLC), yield, wt %: 2.33

Gasoline
Range (TBP), °C.: C_5—80
Yield, vol %: 3.86
RON + 0.4 g TEL/l: 83.7

Heavy naphtha
Range, °C.: 80—150
Yield, vol %: 9.63
Density @ 15° C.: 0.745
Naphthenes, vol %: 37.2
Aromatics, vol %: 10

Kerosine
Range, °C.: 150—230
Density @ 15° C.: 0.793
Sulfur, wt %: 0.021
Freeze pt, °C.: −53
Aromatics, vol %: 16
Smoke pt, mm: 25
Naphthenic acids, ppm: 68

Gas oil
Range, °C.: 230—340
Yield, vol %: 19.99
Density @ 15° C.: 0.838

Sulfur, wt %: 0.12
Cloud pt, °C.: −8
Cetane index: 53.0
Vis., cSt @ 50° C.: 2.73

Heavy gas oil
Range, °C.: 340—510
Yield, vol %: 26.22
Density @ 15° C.: 0.8824
Sulfur, wt %: 0.24
Aniline pt, °C.: 94.0
Basic nitrogen, ppm: 298
Total nitrogen, wt %: 0.10
Con. carbon, wt %: 0.01
V/Ni, ppm: <2/<2

Residue
Range, °C.: 340+
Yield, vol %: 52.16
Density @ 15° C.: 0.920
Sulfur, wt %: 0.21
Vis., cSt @ 50° C.: 160.8
Con. carbon, wt %: 5.5

Zaire, Zaire

CALM with moored storage in offshore producing area

Crude
Gravity, °API: 31.7
Sulfur, wt %: 0.13
Vis., SUS @ 100° F.: 98.0
Pour pt, °F.: +80
C_4 & lighter, vol %: 1.00
Rvp, lb: 2.2
V/Ni, ppm: 1.5/17.8
Salt, lb/1,000 bbl: 6
ASTM, 50% pt, °F.: >590

Light naphtha
Range (TBP), °F.: Ibp—140*
Yield, vol %: 1.84
Sulfur, wt %: 0.037
RON, clear: 79.4

Light naphtha
Range, °F.: 140—170
Yield, vol %: 1.03
Sulfur, wt %: 0.020
Paraffins, vol %: 76.5
Naphthenes, vol %: 22.2
Aromatics, vol %: 1.3
RON, clear: 65.7

Heavy naphtha
Range, °F.: 170—310
Yield, vol %: 8.84
Sulfur, wt %: 0.006
P/N/A, vol %: 53.8/41.6/4.6
Aniline pt, °F.: 133.5

Kerosine
Range, °F.: 310—520
Yield, vol %: 16.31
Sulfur, wt %: 0.074
Freezing pt, °F.: −36
Aniline pt, °F.: 147.2
Cetane index: 50.0
Smoke pt, mm: 27

Light gas oil
Range, °F.: 520—680
Yield, vol %: 15.44
Vis., SUS @ 100° F.: 45.0
Sulfur, wt %: 0.14
Pour pt, °F.: +45
Diesel index: 62.4
Cetane index: 62.0

Heavy gas oil
Range (TBP to EFV), °F.: 680—1,000
Yield, vol %: 31.39
Gravity, °API: 26.7
Vis., SUS @ 210° F.: 54.0
Sulfur, wt %: 0.12
Total nitrogen, ppm: 1,010
Pour pt, °F.: +115
Aniline pt, °F.: 214.3
V/Ni, ppm: 0.1/0.3

Residual oil
Range, °F.: 680+
Yield, vol %: 55.65
Gravity, °API: 21.4
Vis., SUS @ 210° F.: 181.9
Sulfur, wt %: 0.17
Con. carbon res., wt %: 6.03
Pour pt, °F.: +100
V/Ni, ppm: 2.5/30

*Does not include C_4 and lighter

North Africa

Amna (high pour), Libya

Ras Lanuf/CBMs & SPM

Crude
Gravity, °API: 36.1
Sulfur, wt %: 0.15
Pour pt, °F.: 75
Kin. vis., cSt @ 37.8° C.: 13.70
Car. residue (CCR), wt %: 3.7
Rvp, psi: 3.9
Salt, lb/1,000 bbl: 8.2
V/Ni, ppm: 0.6/5.0
Ibp-60° F., yield, vol %: 2.11

Light naphtha
Range, °F.: 60-120
Yield, vol %: 2.4
Gravity, °API: 93.6
Sulfur, wt %: 0.01
Paraffins, vol %: 99.0
Naphthenes, vol %: 1.0
RON, clear: 78.0
RON + 3 ml TEL: 94.0

Light naphtha
Range, °F.: 120-250
Yield, vol %: 7.7
Gravity, °API: 69.5
Sulfur, wt %: 0.01
Paraffins, vol %: 69.9
Naphthenes, vol %: 26.5
Aromatics, vol %: 3.7

Heavy naphtha
Range, °F.: 250-330
Yield, vol %: 6.9
Gravity, °API: 57.4
Sulfur, wt %: 0.02
P/N/A, vol %: 60.5/33.6/5.9

Kerosine
Range, °F.: 330-443
Yield, vol %: 9.4
Gravity, °API: 49.9
Sulfur, wt %: 0.05
P/N/A, vol %: 60.9/29.9/9.2
Pour pt, °F.: −75
Freezing pt, °F.: −58
Aniline pt, °F.: 150.6
Diesel index: 75
Smoke pt, mm: 31

Gas oil
Range, °F.: 443-600
Yield, vol %: 15.0
Gravity, °API: 42.3
Sulfur, wt %: 0.07
Pour pt, °F.: 0
Aniline pt, °F.: 169.1
Diesel index: 71

Gas oil
Range, °F.: 600-850
Yield, vol %: 23.3
Sulfur, wt %: 0.13
Pour pt, °F.: 80
Aniline pt, °F.: 202.0
Diesel index: 69

Residual oil
Range, °F.: 655+
Yield, vol %: 55.4
Gravity, °API: 25.4
Sulfur, wt %: 0.22
Pour pt, °F.: 100
Car. residue CCR, wt %: 6.22
V/Ni, ppm: 1.1/8.5

Residual oil
Range, °F.: 1,000+
Yield, vol %: 21.8
Gravity, °API: 16.7
Sulfur, wt %: 0.31
Pour pt, °F.: 130
Car. residue CCR, wt %: 14.50
V/Ni, ppm: 2.5/20.0

Ashtart, Tunisia

Floating storage barge in Gulf of Gabes producing area

Crude
Gravity, °API: 29.03
Vis. @ 20° C., cSt: 24.0
Pour pt, °C.: +9
Rvp @ 38.7° C., g/sq cm: 130
Total sulfur, wt %: 1.0
Paraffins/Asphaltenes, wt %: 11.0/1.8
Con. carbon, wt %: 5.4
>C_1-C_5, vol %: 1.26
V/Ni, mg/kg: 20/9

Light naphtha
Range (TBP), °C.: 15-100
Yield, vol %: 5.65
Density, 15/4 °C.: 0.702
Rvp, g/sq cm: 500
RON, clear: 63.6
Aromatics, vol %: 10.0

Heavy naphtha
Range (TBP), °C.: 100-145
Yield, vol %: 6.42
Density, 15/4 °C.: 0.759
Paraffins, vol %: 47.2
Naphthenes, vol %: 37.8
Aromatics, vol %: 15.0
Sulfur, wt %: 0.0055

Heavy naphtha
Range (TBP), °C.: 145-180
Yield, vol %: 5.91
Density, 15/4 °C.: 0.785
P/N/A, vol %: 46.5/33.8/19.7
Sulfur, wt %: 0.0120

Kerosine
Range (TBP), °C.: 180-225
Yield, vol %: 6.65
Density, 15/4 °C.: 0.812
Freeze pt, °C.: −54
Vis., cSt @ 50° C.: 1.10
Smoke pt, mm: 21
Sulfur, wt %: 0.04
Aniline pt, °C.: 54.0
Aromatics, vol %: 18.9

Gas oil
Range (TBP), °C.: 145-350
Yield, vol %: 36.04
Density, 15/4 °C.: 0.834
Pour pt, °C.: −21
Cloud pt, °C.: −16
Filterability, °C.: −19
Vis. cSt @ 50° C.: 1.9
Cetane index: 48.8
Sulfur, wt %: 0.44
Diesel index: 54.7
Aniline pt, °C.: 62.0
Con. carbon @ 10%, wt %: <0.05

Residue
Range (TBP), °C.: 350+
Yield, vol %: 51.90
Density, 15.4 °C.: 0.943
Pour pt., °C.: +18
Vis. cSt, @ 50° C.: 225
Sulfur, wt %: 1.42
Con. carbon, wt %: 9.4
V/Ni, ppm: 34/17
N, wt %: 0.40

Brega, Libya

Marsa el Brega/ CBM, SPM, SBM

Crude
Gravity, °API: 40.4
Sulfur, wt %: 0.21
Pour pt., °F.: +30
Rvp, psi: 6.4
Kin., cSt @ 70° F.: 5.58
@ 100° F.: 3.56

Light naphtha
Range, °F.: 68-212
Yield, vol %: 12.4
Gravity, °API: 73.8
Sulfur, wt %: 0.014
Rvp, psi: 7.4
Paraffins, vol %: 72.5
Naphthenes, vol %: 25.3
Aromatics, vol %: 2.2
RON, clear: 65.1

Heavy naphtha
Range, °F.: 212-302
Yield, vol %: 10.7
Gravity, °API: 56.8
Sulfur, wt %: 0.020
P/N/A, vol %: 53.1/39.4/7.5

Kerosine
Range, °F.: 302-455
Yield, vol %: 17.4
Gravity, °API: 46.7
Sulfur, wt %: 0.035
P/N/A, vol %: 51.2/34.7/14.1
Freeze pt., °F.: −70
Smoke pt., mm: 27
Luminometer no.: 61
Aniline pt., °F.: 144
Kin. vis., cSt @ 30° F.: 5.50
@ 100° F.: 1.17

Light gas oil
Range, °F.: 455-650
Yield, vol %: 20.3
Gravity, °API: 38.1
Sulfur, wt %: 0.10
Pour pt., °F.: +15
Aniline pt., °F.: 172
Kin. vis., cSt @ 100° F.: 3.61

Heavy gas oil
Range, °F.: 650-1,049
Yield, vol %: 27.8
Gravity, °API: 27.7
Sulfur, wt %: 0.30
Pour pt., °F.: 105
Aniline pt., °F.: 206
Kin. vis., cSt @ 150° F.: 14.9

Residual oil
Range, °F.: 650+
Yield, vol %: 36.8
Gravity, °API: 23.6
Sulfur, wt %: 0.41
Pour pt., °F.: 95
Con. carbon wt %: 4.1
Kin. vis., cSt @ 100° F.: 184
@ 122° F.: 92.0

Residual oil
Range, °F.: 1,049+
Yield, vol %: 9.0
Gravity, °API: 12.3
Sulfur, wt %: 0.69
Pour pt., °F.: >120
Con. carbon, wt %: 14.6
Kin. vis., cSt @ 210° F.: 620
V/Ni/Fe, ppm: 24/32/124

Bu Attifel, Libya

Zueitina/CBM & SBM

Crude
Gravity, °API: 43.6
Rvp, psi: 0
Sulfur, wt %: 0.034
Pour pt., °F.: +90

Light ends
Range vapor temp., °F.: Ibp-160
Yield, vol %: 2.5

Light naphtha
Range, vapor temp., °F.: 160-290
Yield, vol %: 9.0
Gravity, °API: 62.5
Paraffins, vol %: 75.4
Olefins, vol %: 0.4
Naphthenes, vol %: 18.3
Aromatics, vol %: 5.9

Heavy naphtha
Range, VT, °F.: 290-390
Yield, vol %: 9.0
Gravity, °API: 56.8
Sulfur, wt %: 0.0015
P/O/N/A, vol %: 75.7/0.4/17.8/6.1

Kerosine
Range, VT, °F.: 390-500
Yield, vol %: 11.7
Gravity, °API: 50.3
Sulfur, wt %: 0.005
Aromatics, vol %: 5.6
Smoke pt., mm: 22
Freeze pt., °F.: 9.4
Pour pt., °F.: 10

Diesel
Range, VT, °F.: 500-635
Yield, vol %: 11.3
Gravity, °API: 44.0
Sulfur, wt %: 0.0140
Vis., SSU @ 100° F.: 38.4
Aniline pt., °F.: 192.5
Diesel index: 84.7
Pour pt., °F.: 45

Lt. gas oil
Range, VT, °F.: 635-775
Yield, vol %: 20.7
Gravity, °API: 41.6
Sulfur, wt %: 0.03
Vis., SSU @ 100° F.: 49.5
Pour pt., °F.: +85
UOP "K" factor: 12.6

Heavy gas oil
Range, VT, °F.: 775-932
Yield, vol %: 20.6
Gravity, °API: 37.4
Sulfur, wt %: 0.04
Vis., SSF @ 210° F.: 41.6
Pour pt., °F.: +125
UOP "K" factor: 12.8

Residue
Range, °F.: 932+
Yield, vol %: 15.2
Gravity, °API: 29.2
Sulfur, wt %: 0.10
Carbon residue, wt %: 1.5

El Borma, Tunisia

La Skhirra, Tunisia

Crude
See Algerian Zarzaitine assay. One blend has two names.

Es Sider, Libya

Es Sider/3 CBMs, 1 SBM

Crude
Gravity, °API: 36.7
Kin. vis., cSt @ 100° F.: 5.26
Con. carbon residue, wt %: 1.8
Sulfur, wt %: 0.37
V/Ni, ppm: 1.5/5.6
Pour pt., °C.: +7.2
Rvp, psi: 6.3
C_4 & lighter, vol %: 2.3

Naphtha
Range (TBP), °F.: 82-342
Yield, vol %: 22.2
Gravity, °API: 64.8
Paraffins, vol %: 57.8
Naphthenes, vol %: 36.5
Sulfur, wt %: 0.03

Kerosine
Range (TBP), °F.: 342-472
Yield, vol %: 11.3
Gravity, °API: 46.3
Sulfur, wt %: 0.13
Aromatics, vol %: 13

Heavy distillate
Range (TBP), °F.: 472-705
Yield, vol %: 28.0
Gravity, °API: 35.7
Sulfur, wt %: 0.31

Gas oil
Range (TBP), °F.: 705-980
Yield, vol %: 20.3
Gravity, °API: 25.5
Sulfur, wt %: 0.48

Residue
Range (TBP), °F.: 980+
Yield, vol %: 15.9
Gravity, °API: 12.3
Sulfur, wt %: 1.16
Kin. vis., cSt @ 210° F.: 500
Con. carbon residue, wt %: 14.7
V/Ni, ppm: 8/30

Saharan Blend,* Algeria

Arzew (3 CBMs)
Bejaia (4 jetties)
Skikda

Crude
Gravity, °API: 45.5 (43.7)
Rvp, psi: 8.7 (8.1)
Sulfur, wt %: 0.053 (0.090)
Pour pt., °F.: <−20 (<−20)
Vis. SSU @ 70° F.: 37.3 (40.1)

Light ends
Range, vapor temp., °F.: Ibp-160
Yield, vol %: 10.4 (9.9)

Light naphtha
Range, vapor temp., °F.: 160-290
Yield, vol %: 18.3 (14.9)
Gravity, °API: 64.0 (63.7)
Paraffins, vol %: 70.8 (70.2)
Olefins, vol %: 0.3 (0.4)
Naphthenes, vol %: 21.8 (23.4)
Aromatics, vol %: 7.1 (6.0)

Heavy naphtha
Range, VT, °F.: 290-390
Yield, vol %: 13.7 (14.5)
Gravity, °API: 53.3 (52.1)
P/O/N/A, vol %: 47.4/0.3/36.4/15.9 (55.0/0.3/29.6/15.1)

Kerosine
Range, VT, °F.: 390-500
Yield, vol %: 14.1 (13.4)
Gravity, °API: 44.6 (44.0)
Sulfur, wt %: 0.0056 (0.0030)
Aromatics, vol %: 15.8 (16.4)
Smoke pt, mm: 17 (21)
Freeze pt, °F.: −38.2 (−42.7)

Diesel
Range, VT, °F.: 500-635
Yield, vol %: 12.7 (12.8)
Gravity, °API: 36.6 (35.1)
Sulfur, wt %: 0.0571 (0.0736)
Vis. SSU @ 100° F.: 41.6 (40.3)
Pour pt, °F.: +15 (+5)
Aniline pt, °F.: 170 (165.5)
Diesel index: 62.2 (58.1)

Light gas oil
Range, VT, °F.: 635-775
Yield, vol %: 9.3 (14.3)
Gravity, °API: 31.1 (31.7)
Sulfur, wt %: 0.07 (0.13)
Vis. SSU @ 100° F.: 57.5 (63.0)
Pour pt, °F.: +50 (+40)

Heavy gas oil
Range, VT, °F.: 775-932
Yield, vol %: 12.0 (10.0)
Gravity, °API: 28.6 (26.5)
Sulfur, wt %: 0.10 (0.18)
Vis., SSU @ 210° F.: 49.6 (54.5)
Pour pt, °F.: +90 (+90)
Carbon residue, wt %: 0.05 (0.06)

Residue
Range, VT, °F.: 932+
Yield, vol %: 9.5 (10.2)
Gravity, °API: 21.2 (19.9)
Sulfur, wt %: 0.22 (0.28)
Vis., SSF, @ 210° F.: 38.0 (45.1)
Carbon residue, wt %: 6.8 (7.4)

*Gravity of Saharan Blend has not been consistent. Values in parenthesis are those for 43.7 °API blend.

Sarir, Libya

Marsa al Hariga (Tobruk)/CBM

Crude
Gravity, °API: 38.3
Sulfur, wt %: 0.18
Pour pt, °F.: 25
Kin. vis. cSt @ 50° C.: 4.73
Yield, C_2-C_4, vol %: 3.82
V/Ni, ppm: 6/14

Naphtha
Range, °C.: Ibp-180
Yield, vol %: 22.89
Total sulfur, ppm: 14
Paraffins, vol %: 60.8
Naphthenes, vol %: 35.8
Aromatics, vol %: 3.4

Kerosine
Range, °C.: 180-250
Yield, vol %: 11.27
Total sulfur, ppm: 83
Smoke pt, mm: 30

Gas oil
Range, °C.: 250-320
Yield, vol %: 10.99
Total sulfur, wt %: 0.063
Pour pt, °C.: −6
Aniline pt, °C.: 80

Resid
Range, °C.: 320+
Yield, vol %: 51.41
Total sulfur, wt %: 0.24
Vis. cSt @ 60° C.: 49
Con. carbon, wt %: 6.8

Resid
Range, °C.: 550+
Yield, vol %: 17.25
Total sulfur, wt %: 0.35
Con. carbon, wt %: 20
Asphaltenes, wt %: 4.7

Sirtica, Libya

Ras Lanuf/CBMs & SBM

Crude
Gravity, °API: 43.3
Total sulfur, wt %: 0.43
Pour pt, °C.: −3
Yield C_2-C_4, wt %: 3.24
Rvp, psi: 10.1

Condensate
Yield, vol %: 42

Naphtha
Range, °C.: Ibp-180
Yield, vol %: 39.7
Gravity, °API: 62.8
Total sulfur, wt %: 0.015
P/N/A, vol %: 69.7/22.8/7.5

Gas oil
Range, °C.: 180-350
Yield, vol %: 29.8
Gravity, °API: 38.7
Total sulfur, wt %: .21
Pour pt, °C.: −15

Resid
Range, °C.: 350+
Yield, vol %: 25.5
Gravity, °API: 19.1
Total sulfur, wt %: 1.16
Vis. cSt @ 180° F.: 39.0
Pour pt, °C.: 39
Con. carbon, wt %: 5.7

Zarzaitine, Algeria

La Skhirra, Tunisia

Crude
Gravity, °API: 43.0
Vis. cSt @ 10° C.: 6.90
Pour pt, °C.: −12
Rvp @ 37.8° C., g/sq cm: 603
Total sulfur, wt %: 0.07
Paraffins, wt %: 4.89
Con. carbon, wt %: 0.90
V/Ni, mg/kg: 1/3
Yield C_1-C_5, vol %: 7.31

Light naphtha
Range, °C.: C_5-80
Yield, vol %: 8.94
Density, 15/4 °C.: 0.662
RON, clear: 68.8
MON, clear: 64.6
Aromatics, vol %: 0.9

Heavy naphtha
Range, °C.: 80-145
Yield, vol %: 15.13
Density, 15/4 °C.: 0.738
Paraffins, vol %: 59.4
Naphthenes, vol %: 33.9
Aromatics, vol %: 6.7
Sulfur, wt %: 0.0138

Kerosine
Range, °C.: 145-225
Yield, vol %: 16.58
Density, 15/4 °C.: 0.784
Freeze pt, °C.: −65
Vis. cSt @ 34.4° C.: 4.50
Smoke pt, mm: 25
Sulfur, wt %: 0.0162
Aromatics, vol %: 14.2

Gas oil
Range, °C.: 225-290
Yield, vol %: 12.55
Density, 15/4 °C.: 0.822
Pour pt, °C.: −36
Cloud pt, °C.: −27
Filterability, °C.: −34
Vis. cSt @ 50° C.: 1.95
Sulfur, wt %: 0.025

Gas oil
Range, °C.: 290-350
Yield, vol %: 10.89
Density, 15/4 °C.: 0.843
Pour pt, °C.: −3
Vis. cSt @ 50° C.: 4.18
Sulfur, wt%: 0.045

Residue
Range, °C.: 350+
Yield, vol %: 32.47
Pour pt, °C.: +21
Density, 15/4 °C.: 0.899
Vis., cSt @ 50° C.: 80
Sulfur, wt %: 0.155
Asphaltenes, wt %: 0.21
Con. carbon, wt %: 2.48
V, ppm: 2.5

Zueitina, Libya

Zueitina/CBMs & SBM

Crude
Gravity, °API: 41.3
Rvp, psi: 4.6
Sulfur, wt %: 0.28
Pour pt, °F.: 45
Vis. SSU @ 60° F.: 199.1

Light ends
Range, °F.: Ibp–113
Yield, vol %: 6.44

Light naphtha
Range, °F.: 113-220
Yield, vol %: 9.32
Gravity, °API: 66.9
Paraffins, vol %: 65.5
Naphthenes, vol %: 30.9
Aromatics, vol %: 3.6

Naphtha
Range, °F.: 220-390
Yield, vol %: 21.42
Gravity, °API: 53.9
Sulfur, wt %: 0.04
P/N/A, vol %: 59.2/27.0/10.2

Kerosine
Range, °F.: 315-500
Yield, vol %: 21.65

Gravity, °API: 45.6
Total sulfur, wt %: 0.11
Aromatics, vol %: 14.0
Smoke pt, mm: 27
Freeze pt, °F.: −36
Pour pt, °F.: −45

Light distillate
Range, °F.: 390-550
Yield, vol %: 18.16
Gravity, °API: 41.7
Cetane index: 53.0
Total sulfur, wt %: 0.17
Aniline pt, °F.: 159.0
Pour pt, °F.: −10

Light gas oil
Range, °F.: 450-650
Yield, vol %: 21.17
Gravity, °API: 38.4
Cetane index: 57.8
Total sulfur, wt %: 0.24
Total nitrogen, ppm: 78
Aniline pt, °F.: 173.0
Pour pt, °F.: 25

Heavy gas oil
Range, °F.: 650-1,000
Yield, vol %: 24.09
Gravity, °API: 29.1
Sulfur, wt %: 0.36
Total nitrogen, ppm: 922
Pour pt, °F.: 100
Carbon residue, wt %: 0.18

Vacuum flashed resid
Range, °F.: 1,000 +
Yield, vol %: 10.11
Gravity, °API: 13.5
Total sulfur, wt %: 0.90

Asia

Ardjuna, Indonesia

SBM 18.5 miles off north coast of Java in producing area

Crude
Gravity, °API: 35.2
Sulfur, wt %: 0.105
Pour pt, °F.: 75
Rvp, lb: 5.3
Kin. vis. @ 100° F.: 3.738
Carbon residue, wt %: 1.38
V/Ni, ppm: <1/3
Nitrogen, ppm: 280
Yield, C_4 & lighter, vol %: 2.6

Naphtha
Range (TBP), °F.: C_5—150
Yield, vol %: 5.0
Sulfur, wt %: 0.005
RON, clear: 76.6
RON + 0.5 g TEL/gal: 82.7
MON, clear: 74.8

Heavy naphtha
Range, °F.: 150-380
Yield, vol %: 27.2
Gravity, °API: 50.8
Sulfur, wt %: 0.012
Paraffins, vol %: 34.3
Naphthenes, vol %: 46.0
Aromatics, vol %: 19.7
RON, clear: 64.6
MON, clear: 63.0

Distillate
Range, °F.: 380-520
Yield, vol %: 16.4
Gravity, °API: 33.0
Sulfur, wt %: 0.059
Pour pt, °F.: −65
Cetane no.: 36.3
Smoke pt, °F.: 12.5
Freezing pt, °F.: −39.5
Aromatics, vol %: 34.6
Total N, ppm: 4.0
Cloud pt, °F.: −46
Vis., cSt @ 100° F.: 1.967

Distillate
Range, °F.: 520-650
Yield, vol %: 14.0
Gravity, °API: 30.7
Sulfur, wt %: 0.099
Pour pt, °F.: −65
Cetane no.: 47.0
Total N, ppm: 33.0
Cloud pt, °F.: −26
Vis., cSt @ 100° F.: 4.689

Blended gas oil
Range, °F.: 650-840
Yield, vol %: 16.9
Gravity, °API: 25.1
Sulfur, wt %: 0.156
Aniline pt, °C.: 86.7
Pour pt, °F.: 90
Kin. vis. @ 210° F.: 3.983
Carbon residue, wt %: 0.02
Total nitrogen, ppm: 200

Residue
Range, °F.: 650 +
Yield, vol %: 34.8
Gravity, °API: 21.1
Sulfur, wt %: 0.199
Carbon residue, %: 2.94
Total nitrogen, ppm: 670
Pour pt, °F.: 100
Kin. vis. @ 210° F.: 5.414

Vacuum residue
Range: Bottoms from vacuum flashed 650 + °F. resid @ 725° F.
Yield, vol %: 5.9
Gravity, °API: 5.1
Sulfur, wt %: 0.292
Carbon residue, wt %: 17.86
V/Ni, ppm: 7/30

Arimbi, Indonesia

Balongan sea terminal/SBM about 6.5 nautical miles off north coast of Java

Crude
Gravity, °API: 31.8
Sulfur, wt %: 0.204
Pour pt, °F.: 100
Vis., cSt @ 100° F.: 12.54
Carbon residue, wt %: 2.41
V/Ni, ppm: 0.9/2.6
Nitrogen, ppm: 531

Naphtha
Range (TBP), °F.: C_5—230
Yield, vol %: 10.6
Sulfur, wt %: < 0.001
RON, clear: 64.6
RON + 0.5 g TEL/gal: 71.7

Naphtha
Range, °F.: 230-335
Yield, vol %: 11.2
Sulfur, wt %: 0.030
Total nitrogen, ppm: 1
Paraffins, vol %: 42.3
Naphthenes, vol %: 47.0
Aromatics, vol %: 10.7

Distillate
Range, °F.: 335-520
Yield, vol %: 17.3
Gravity, °API: 34.6
Sulfur, wt %: 0.107
Cetane no.: 37.3
Smoke pt, °F.: 14
Freezing pt, °F.: −32
Aromatics, vol %: 35.3

Distillate
Range, °F.: 520-650
Yield, vol %: 14.7
Gravity, °API: 31.6
Sulfur, wt %: 0.213
Pour pt, °F.: 45
Cetane no.: 50.2
Cloud pt, °F.: 50
Vis., cSt @ 100° F.: 5.450

Blended gas oil
Range, °F.: 650-840
Yield, vol %: 15.9
Gravity, °API: 29.0
Sulfur, wt %: 0.168
Aniline pt, °C.: 93.4
Pour pt, °F.: 110
Vis., cSt @ 210° F.: 4.385
Carbon residue, %: 0.008
Nitrogen, ppm: 266

Residue
Range, °F.: 650 +
Yield, vol %: 45.9
Gravity, °API: 20.5
Sulfur, wt %: 0.240
Carbon residue, %: 5.27
Total nitrogen, ppm: 1,010
Pour pt, °F.: 120 +
Vis. @ 210° F. (D2170): 22.29
V/Ni, ppm: 2.7/9.8

Attaka, Indonesia

Santan marine terminal about 80 miles north of Balikpapan, Kalimantan/SBM about 4 miles offshore

Crude
Gravity, °API: 42.3
Vis., cSt @ 70° F.: 1.7
Pour pt, °F.: −10
Rvp @ 100° F., psi: 6.8
Total acid no., Mg KOH/g: 0.20
Sulfur, wt %: 0.09
Wax, wt %: 4.22
Con. carbon residue, wt %: 0.34
Charac. factor, K UOP: 11.5

Naphtha
Range, °C.: C_5—100
Yield, vol %: 15.3
RON, clear: 74.9

Naphtha
Range, °C.: 100-150
Yield, vol %: 17.6
Paraffins, vol %: 41
Naphthenes, vol %: 35
Aromatics, vol %: 24.7

Kerosine
Range, °C.: 150-250
Yield, vol %: 29.6
Smoke pt, mm: 16
Freezing pt, °C.: −54

Gas oil
Range, °C.: 250-350
Yield, vol %: 25
Diesel index: 51
Cetane no.: 52.6

Fuel oil
Range, °C.: 350 +
Yield, vol %: 12.5
Sulfur, wt %: 0.11
Pour pt, °F.: 100

Note: Attaka is mixed wtih Badak crude and other streams and shipped with Attaka specifications.

Badak, Indonesia

Santan terminal about 80 miles north of Balikpapan, Kalimantan/SBM some 4 miles offshore

Crude
Gravity, °API: 41.3
Vis., cSt @ 100° F.: 5.72
Pour pt., °F.: −15
Rvp @ 100° F., psi: 5.6
Total acid number, mg KOH/g: 0.11
Sulfur, wt %: 0.08
Wax, wt %: 7.35
Con. carbon, wt %: 0.313
Charac. factor, K UOP: 12.5
Note: Badak is mixed with Attaka crude and shipped with Attaka specifications.

Bekapai, Indonesia

Senipah marine terminal about 27 miles northeast of Balikpapan, Kalimantan/SBM about 6 miles offshore

Crude
Gravity, °API: 40
Sulfur, wt %: 0.08
Pour pt., °C.: −21
Rvp, psi: 1.9
Vis.,cSt @ 37.8° C.: 2.02
Con. carbon, wt %: 0.25
Asphaltenes, wt %: <0.05
V/Ni, ppm: <0.5/<0.5
Yield C_4 & lighter, wt %: 0.51

Gasoline
Range, °C.: C_5—100
Yield, wt %: 8.17
Gravity, °API: 63.6
Sulfur, ppm: <1
Paraffins, vol %: 45.8
Naphthenes, vol %: 47.6
Aromatics, vol %: 6.6
RON, clear: 73.8
RON + 0.6 g TEL/l: 88.5

Naphtha
Range, °C.: 100-185
Yield, wt %: 25.12
Gravity, °API: 49.1
Sulfur, ppm: 68
P/N/A, vol %: 33.2/48.9/17.9

Kerosine
Range, °C.: 185-230
Yield, wt %: 15.98
Gravity, °API: 42.5
Sulfur, wt %: 0.038
Aromatics, vol %: 18
Smoke pt., mm: 22
Freezing pt., °C.: −50.5

Gas oil
Range, °C.: 185-375
Yield, wt %: 52.06
Gravity, °API: 37.5
Sulfur, wt %: 0.083
Vis., cSt @ 37.8° C.: 2.62
Aniline pt., °C.: 67.6
Pour pt., °C.: −21

Residue
Range, °C.: 375+
Yield, wt %: 14.14
Gravity, °API: 18.9
Sulfur, wt %: 0.22
Vis., cSt @ 50° C.: 835
Pour pt., °C.: >+45
Con. carbon, wt %: 1.7
V/Ni, ppm: <2/2

Bekok, Malaysia

Piped ashore to terminal north of Chukai, Kuala Trengganu area, peninsular Malaysia as part of Tapis Blend

Crude
Gravity, °API: 49.07
Vis., cSt @ 100° F.: 1.74
Pour pt., °F.: 26
Sulfur, ppm: 210
Total nitrogen, wt %: 0.0136
Neutralization no., mg KOH/g: 0.035
Rvp, psi: 7.6
Con. carbon residue, wt %: 0.22
V/Ni, ppm: <1/<1
Wax, wt %: 6.05
Yield, C_4 & lighter: 2.7

Light naphtha
Range, °F.: C_5-145
Yield (VT), vol %: 7.05
RON, clear: 72

Heavy naphtha
Range, °F.: 145-330
Yield, vol %: 26.76
Sulfur, ppm: 5
Total nitrogen, ppm: 0.7
RON, clear: 45
Paraffins, wt %: 57.40
Naphthenes, wt %: 29.27
Aromatics, wt %: 13.33

Kerosine
Range, °F.: 330-450
Yield, vol %: 15.74
Sulfur, ppm: 20
Freezing pt., °F.: −45
Cloud pt., °F.: −47
Smoke pt., mm: 20
Cetane index: 57.33
Diesel index: 76.48
Vis., cSt @ 70° F.: 1.64

Distillate
Range, °F.: 450—650
Yield, vol %: 26.13
Gravity, °API: 41.65
Sulfur, ppm: 220
Cetane index: 64.34
Diesel index: 74.34
Aniline pt., °C.: 81.5
Vis., cSt @ 70° F.: 5.15

Heavy gas oil
Range, °F.: 680-975
Yield, vol %: 15.85
Gravity, °API: 32.84
Sulfur, ppm: 600
Total nitrogen, ppm: 533
Pour pt., °F.: 113
Con. carbon residue, wt %: 0.059
Sodium, ppm: 13.84
V/Ni, ppm: 0.008/0.01
Vis., cSt @ 130° F.: 11.32

Atmospheric residue
Range, °F.: 650+
Yield, vol %: 21.62
Gravity, °API: 31.54
Sulfur, ppm: 700
Pour pt., °F.: 113
Con. carbon residue, wt %: 1.986
Sodium, ppm: 0.125
V/Ni, ppm: <0.002/<0.01
Vis., cSt @ 130° F.: 27.37

Note: Bekok is contributor to Tapis blend

Bintulu, Malaysia

Bintulu SBM terminal off Sarawak

Crude
Gravity, °API: 26.5
Vapor pressure, Kg/sq cm: 0.21
Pour pt., °C.: −5.0
Vis., cSt @ 56° C.: 4.54
Carbon residue, wt %: 1.69
Sulfur, wt %: 0.13
Acid no. KOH mg/g: 0.43
Nitrogen, ppm: 450
Distillation, °C.:
Ibp—28
5%—104
10%—135
15%—169
20%—199
25%—227
30%—245
35%—259
40%—273
45%—285
47%—290

Note: Bintulu comes solely from Temana field offshore Sarawak

Bunyu, Indonesia

Bunyu Island terminal off east coast of Kalimantan/Four point CBM

Crude
Gravity, °API: 31.7
Vis., cSt @ 100° F.: 2.67
Pour pt., °F.: 60
Rvp @ 100° F., psi: 1.0
Sulfur, wt %: 0.09
Wax, wt %: 8.3
Con. carbon residue, wt %: 0.39
Charac. factor, K UOP: 11.4

Gasoline
Range, °C.: C_5—175
Yield, vol %: 18.5
RON, clear: 74.9

Kerosine
Range, °C.: 175-300
Yield, vol %: 49.0
Smoke pt., mm: 10

Gas oil
Range, °C.: 300-350
Yield, vol %: 13.0
Diesel index: 41

Residue
Range, °C.: 350+
Yield, vol %: 19.5
Sulfur, wt %: 0.20
Pour pt., °F.: 115

Note: In late 1982 there were plans to mix Bunyu with Sembakung crude (37° API). This assay of sample that did not contain Sembakung.

Champion Export, Brunei

Seria SBM

Crude
Gravity, °API: 23.9
Vis. @ 10° C., sq mm/sec: 21.1
Sulfur, wt %: 0.12
Wax, wt %: 0.4
Pour pt, °C.: −36
Total acid no., mg KOH/g: 0.50
UOP K factor: 11.2
Yield light hydrocarbons, wt %: 0.70

Gasoline
Range, °C.: C_5—65
Yield, vol %: 0.4
Rvp, kPa: 70

Naphtha
Range, °C.: 65—100
Yield, vol %: 2.0
Sulfur, mg/kg: 24
RON, clear: 77
RON + 0.5 g Pb/l (TEL): 88

Naphtha
Range, °C.: 100-150
Yield, vol %: 4.5
SUlfur, mg/kg: 74
RON, clear: 71
Paraffins, wt %: 20
Naphthenes, wt %: 69
Aromatics, wt %: 11

Naphtha
Range, °C.: 150-200
Yield, vol %: 8.1
Density @ 15° C., kg/l: 0.827
Sulfur, mg/kg: 251
P/N/A, wt %: 15/69/16
Smoke pt, mm: 22

Kerosine
Range, °C.: 200-250
Yield, vol %: 16.2
Density @ 15° C.: 0.870
Sulfur, wt %: 0.06
Cloud pt, °C.: −60
Smoke pt, mm: 18
Aniline pt, °C.: 46.9
Cetane no.: 31

Gas oil
Range, °C.: 250-300
Yield, vol %: 22.6
Density @ 15° C., kg/l: 0.899
Vis. @ 40° C., sq mm/sec: 3.84
Pour pt, °C.: −57
Aromatics, wt %: 36
Smoke pt, mm: 15
Cetane no.: 29

Gas oil
Range, °C.: 300-350
Yield, vol %: 15.2
Density @ 15° C., kg/l: 0.930
Vis. @ 40° C., sq mm/sec: 10.2
Sulfur, wt %: 0.17

Heavy gas oil
Range, °C.: 350-370
Yield, vol %: 4.3
Density @ 15° C., kg/l: 0.951
Pour pt, °C.: 6
Total nitrogen, mg/kg: 194

Residue
Range, °C.: 370+
Yield, vol %: 26.4
Density @ 15° C., kg/l: 0.991
Vis. @ 60° C., sq mm/sec: 912
Sulfur, wt %: 0.25
Pour pt, °C.: 21
V/Ni, mg/kg: <1/3

Note: Assay sample contained 67 vol % Champion crude, 18 vol % Magpie, and 15 vol % Seria Land Heavy.

Cinta, Indonesia

SBM and floating storage barge in Java Sea producing area

Crude
Gravity, °API: 33.4
Sulfur, wt %: 0.075
Pour pt, °F.: 105
Vis., cSt @ 100° F.: 64.34
Rvp, lb: 1.4
V/Ni, ppm: 0.1/9.5
Wax content, wt %: 30.3
C_5 & lighter, vol %: 3.143

Light naphtha
Range, °F.: C_5-180
Yield, vol %: 1.89
Sulfur, ppm: 2.3
RON, clear: 61.0
RON + 3 ml TEL/gal: 84.8

Naphtha
Range, °F.: 180-300
Yield, vol %: 4.84
Sulfur, ppm: 5.1
RON, clear: 48.4
RON + 3 ml TEL/gal: 74.4
Paraffins, vol %: 55.2
Olefins, vol %: 0.9
Naphthenes, vol %: 39.0
Aromatics, vol %: 4.9

Heavy naphtha
Range, °F.: 300-380
Yield, vol %: 4.02
Gravity, °API: 53.3
Sulfur, ppm: 12.0
P/O/N/A, vol %: 67.6/1.7/22.6/8.1

Kerosine
Range, °F.: 380-450
Yield, vol %: 2.04
Gravity, °API: 48.6
Sulfur, ppm: 91.4
Smoke pt, mm: 34
Pour pt, °F.: −30
Aniline pt, °F.: 156.7
Aromatics (FIA), %: 8.4
Cetane no.: 46.5
Diesel index: 76.2

Gas oil
Range, °F.: 450-650
Yield, vol %: 11.99
Gravity, °API: 42.2
Sulfur, wt %: 0.04
Cetane number: 58.5
Pour pt, °F.: 15
Vis., cSt @ 100° F.: 2.74

Heavy gas oil
Range, °F.: 650-1,050
Yield, vol %: 40.06
Gravity, °F.: 34.7
Sulfur, wt %: 0.065
Con. carbon, wt %: 0.07
Total nitrogen, wt %: 0.15
Basic nitrogen, wt %: 0.009
V/Ni, ppm: 0.1/0.1
Pour pt, °F.: 115
Aromatics (FIA), %: 15.6
Vis., cSt @ 130° F.: 10.0

Residue
Range, °F.: 650+
Yield, vol %: 74.3
Gravity, °API: 27.6
Sulfur, wt %: 0.09
Con. carbon, wt %: 6.05
V/Ni, ppm: 0.1/2.3
Pour pt, °F.: >120
Total nitrogen, wt %: 0.25
Vis., cSt @ 130° F.: 123.7

Daqing, China (see Taching)

Duri (Sumatran Heavy), Sumatra, Indonesia

Port of Dumai, Sumatra

Crude
Gravity, °API: 21.1
Sulfur, wt %: 0.20
Vis., cSt @ 122° F.: 131.9
Pour pt, °F.: 54
C_4 & lighter, vol %: 0.02

Light naphtha
Range (TBP), °F.: C_5-200
Yield, vol %: 0.48
Gravity, °API: 70.7
Sulfur, wt %: 0.007
Paraffins, vol %: 66.1
Naphtha, vol %: 33.5
Aromatics, vol %: 0.4

Heavy naphtha
Range (TBP), °F.: 200-340
Yield, vol %: 3.2
Gravity, °API: 51.1
Sulfur, wt %: 0.009
P/N/A, vol %: 31/62/7

Kerosine
Range (TBP), °F.: 340-460
Yield, vol %: 6.0
Gravity, °API: 36.3
Sulfur, wt %: 0.039
Smoke pt, mm: 18
Freeze pt, °F.: −73

Gas oil
Range (TBP), °F.: 460-650
Yield, vol %: 14.7
Gravity, °API: 27.4
Sulfur, vol %: 0.136
Pour pt, °F.: −1
Diesel index: 37.9

Reduced crude
Range (TBP), °F.: 650+
Yield, vol %: 75.6
Gravity, °API: 17.6
Sulfur, wt %: 0.21
Pour pt, °F.: 86
Vis., cSt @ 122° F.: 1,134
Rams. carbon, wt %: 7.8
V/Ni/Fe, wt % ppm: 1/16/0

Handil, Kalimantan, Indonesia

SBM about 6 miles offshore 27 miles northeast of Balikpapan

Crude
Gravity, °API: 32.75
Sulfur, wt %: 0.079
Pour pt, +85° F.
Rvp, psi: 1.6
Vis., cSt @ 37.8° C.: 4.2
Con. carbon, wt%: 1
V/Ni, ppm: <0.5/<1
C_4 & lighter, wt %: 0.5

Gasoline
Range, °C.: C_5—75
Yield, wt %: 2.2
Gravity, °API: 69.4
Sulfur, ppm: 5
Paraffins, vol %: 64
Naphthenes, vol %: 20.2
Aromatics, vol %: 15.8
RON, clear: 79.7
RON + 0.6 g TEL/l: 89.2

Naphtha
Range, °C.: 75-145
Yield, wt %: 11.4
Gravity, °API: 45.8
Sulfur, ppm: 9
P/N/A, vol %: 21.8/33.3/44.9

Kerosine
Range, °C.: 145-250
Yield, wt %: 19.3
Gravity, °API: 33.6
Sulfur, ppm: 136
Aromatics (FIA), vol %: 44.2
Smoke pt, mm: 9
Freezing pt, °C.: −49

Gas oil
Range, °C.: 145-350
Yield, wt %: 46.3
Gravity, °API: 31.6
Sulfur, wt %: 0.061
Vis., cSt @ 20° C.: 2.49
Aniline pt, °C.: 51.8
Pour pt, °C.: −7

Residue
Range, °C.: 350+
Yield, wt %: 39.6
Gravity, °API: 25.1
Sulfur, wt %: 0.13
Vis., cSt @ 50° C.: 46.7
Pour pt, °C.: +45
Con. carbon, wt %: 2.6
V/Ni, ppm: <1/<2

Jatibarang, Java, Indonesia

SBM terminal about 6.5 nautical miles off north coast of Java

Crude
Gravity, °API: 29.0
Vis., cSt @ 122° F.: 83.8
Pour pt, °F.: 110
Rvp @ 100° F., psi: 0.2
Sulfur content, wt %: 0.07
Wax content, wt %: 24.6
Con. carbon residue, wt %: 7.53
Charac. factor, K UOP: 12.5

Gasoline
Range, °C.: Ibp-100
Yield, vol %: 3.6
RON, clear: 70.0

Naphtha
Range, °C.: 100-175
Yield, vol %: 7.9
Paraffins, vol %: 46.0
Naphthenes, vol %: 43.0
Aromatics, vol %: 11.0

Kerosine
Range, °C.: 175-250
Yield, vol %: 7.0
Smoke pt, mm: 21.0

Gas oil
Range, °C.: 250-350
Yield, vol %: 13.1
Diesel index: 67.5

Residue
Range, °C.: 350+
Yield, vol %: 68.4
Sulfur, wt %: 11.0
Pour pt, °F.: 120

Labuan Blend, Sabah, Malaysia

SBM in South China Sea off Labuan Island terminal

Crude
Gravity, °API: 33.2
Vis., cSt @ 70° F.: 4.41
Pour pt, °F.: 52
Sulfur, ppm: 917
Neut. no., mg KOH/g: 0.30
Rvp, psi: 3.52
Con. carbon residue, wt %: 2.54
V/Ni, ppm: 0.015/<0.002
Wax content, wt %: 2.34
Asphaltene content, wt %: 0.22
C_5 & lighter, wt %: 1.3

Light naphtha
Range, °F.: C_5-145
Yield, vol %: 2.0
Sulfur, ppm: <5
Rvp, psi: 12.4

Heavy naphtha
Range, °F.: 145-330
Yield, vol %: 18.80
Sulfur, ppm: 20
RON, clear: 67.0
RON + 3 cc TEL/U.S. gal: 85.0
Paraffins, wt %: 17.52
Naphthenes, wt %: 74.58
Aromatics, wt %: 7.89

Kerosine
Range, °F.: 330-450
Yield, vol %: 18.00
Gravity, °API: 38.70
Sulfur, ppm: 140
Freezing pt, °F.: −81.4
Pour pt, °F.: <−17
Smoke pt, mm: 21
Cetane index: 34.39
Diesel index: 44

Distillate
Range, °F.: 450-650
Yield, vol %: 38.27
Gravity, °API: 29.27
Sulfur, wt %: 0.07
Cloud pt, °F.: 19.4
Cetane index: 40.09
Diesel index: 38
Aniline pt, °C.: 55
Con. carbon residue, wt %: nil
Vis., cSt @ 70° F.: 6.43

Residue
Range, °F.: 650+
Yield, vol %: 21.96
Sulfur, wt %: 0.15
Nitrogen, ppm: 531
Pour pt, °F.: 89.6
Con. carbon residue, wt %: 1.62
V/Ni, ppm: 0.03/0.08
Vis., cSt @ 100° F.: 125.8

Heavy gas oil
Range, °F.: 680-975
Yield, vol %: 16.83
Gravity, °API: 15.79
Sulfur, wt %: 0.14
Total nitrogen, ppm: 586
Basic nitrogen, ppm: 144
Pour pt, °F.: 98
Con. carbon residue, wt %: 0.30
Vis., cSt @ 100° F.: 173.61

Note: Labuan Blend comes from offshore fields connected to North Sabah Trunk Line. They include Samarang and South Furious. Erb West, St. Joseph and Barton were to be added during late 1983.

Minas (Sumatran Light), Sumatra, Indonesia

Port of Dumai, Sumatra

Crude
Gravity, °API: 34.5
Sulfur, wt %: 0.081
Vis., cSt @ 122° F.: 12.4
Pour pt, °F.: 97
C_4 & lighter, vol %: 0.27

Light naphtha
Range (TBP), °F.: C_5-200
Yield, vol %: 2.83
Gravity, °API: 80.0
Sulfur, wt %: 0.001
Paraffins, vol %: 75
Naphtha, vol %: 25
Aromatics, vol %: nil

Heavy naphtha
Range (TBP), °F.: 200-340
Yield, vol %: 9.4
Gravity, °API: 60.2
Sulfur, wt %: 0.002
P/N/A, vol %: 62/30/8

Kerosine
Range (TBP), °F.: 340-460
Yield, vol %: 10.5
Gravity, °API: 47.2
Sulfur, wt %: 0.015
Smoke pt, mm: 35
Freeze pt, °F.: −34

Gas oil
Range (TBP), °F.: 460-650
Yield, vol %: 20.2
Gravity, °API: 39.6
Sulfur, vol %: 0.061
Pour pt, °F.: 44
Diesel index: 72

Reduced crude
Range (TBP), °F.: 650+
Yield, vol %: 56.8
Gravity, °API: 26.5
Sulfur, wt %: 0.15
Pour pt, °F.: 106
Vis., cSt @ 122° F.: 101.2
Rams. carbon, wt %: 5.1
V/Ni/Fe, wt % ppm: 1/15/10

Miri Light, Sarawak, Malaysia

SBMs off Miri terminal

Crude
Gravity, °API: 36.27
Vis., cSt @ 70° F.: 3.65
Pour pt, °F.: 34
Sulfur, ppm: 825
Total nitrogen, wt %: 0.0137
Neut. no., mg KOH/g: 0.175
Rvp, psi: 4.7
Con. carbon residue, wt %: 2.94
V/Ni, ppm: 0.012/<0.002
Wax content, wt %: 2.83
Asphaltene content, wt %: 0.258
C_5 & lighter, wt %: 2.2

Light naphtha
Range, °F.: C_5-145
Yield, vol %: 1.60
Sulfur, ppm: <5
Rvp, psi: 10.5

Heavy naphtha
Range, °F.: 145-330
Yield, vol %: 23.10
Sulfur, ppm: 17
RON, clear: 66.5
RON + 3 cc TEL/U.S. gal: 84.5
Paraffins, wt %: 14.55
Naphthenes, wt %: 68.94
Aromatics, wt %: 16.51

Kerosine
Range, °F.: 330-450
Yield, vol %: 15.80
Sulfur, ppm: 125
Freezing pt, °F.: < −70
Gravity, °API: 40.65
Smoke pt, mm: 21
Cetane index: 35.3
Diesel index: 47

Light distillate
Range, °F.: 450-650
Yield, vol %: 33.09
Gravity, °API: 30.99
Sulfur, ppm: 600
Cetane index: 41.1
Diesel index: 43
Aniline pt, °C.: 60
Vis., cSt @ 70° F.: 6.23

Residue
Range, °F.: 650+
Yield, vol %: 25.26
Gravity, °API: 21.01
Sulfur, wt %: 0.17
Pour pt, °F.: 100.4
Con. carbon residue, wt %: 2.22
V/Ni, ppm: 0.030/0.001
Vis., cSt @ 100° F.: 217.26

Heavy gas oil
Range, °F.: 680-975
Yield, vol %: 20.26
Gravity, °API: 20.71
Sulfur, ppm: 0.15
Total nitrogen, ppm: 584
Basic nitrogen, ppm: 95
Pour pt, °F.: 35
Vis., cSt @ 100° F.: 103.85

Note: Miri is blend of 7 offshore fields. Miri Land crude no longer produced.

Pulai, Malaysia

Piped ashore to terminal north of Chukai, Kuala Trengganu area, peninsular Malaysia, as part of Tapis Blend.

Crude
Gravity, °API: 42.52
Vis., cSt @ 70° F.: 2.12
Pour pt, °F.: 23
Sulfur, ppm: 160
Total nitrogen, ppm: 33.5
Rvp, psi: 2.7
Con. carbon residue, wt %: 0.11
V/Ni, ppm: 1.4/0.1
Wax content, wt %: 3.11
Asphaltene content, wt %: 0.31
C_4 & lighter, vol %: 0.45

Light naphtha
Range, °F.: C_5-145
Yield, vol %: 2.03
Sulfur, ppm: <5

Heavy naphtha
Range, °F.: 145-330
Yield, vol %: 27.93
Sulfur, ppm: <5
RON, clear: <70
Paraffins, wt %: 31.83
Naphthenes, wt %: 26.44
Aromatics, wt %: 31.38

Kerosine
Range, °F.: 330-450
Yield, vol %: 27.85
Sulfur, ppm: 19
Freezing pt, °F.: −67
Pour pt, °F.: −66
Smoke pt, mm: 21
Cetane index: 43.17
Diesel index: 56.62
Vis., cSt @ 70° F.: 1.71

Light distillate
Range, °F.: 450-650
Yield, vol %: 34.14
Gravity, °API: 34.8
Sulfur, ppm: 270
Cloud pt, °F.: +14
Cetane index: 48.63
Diesel index: 54.04
Aniline pt, °C.: 68.5
Vis., cSt @ 70° F.: 5.01

Residue
Range, °F.: 650+
Yield, vol %: 7.60
Gravity, °API: 28.20
Sulfur, ppm: 800
Nitrogen, ppm: 323
Pour pt, °F.: 102
Aniline pt, °C.: 91
Con. carbon residue, wt %: 1.58
V/Ni, ppm: <0.01/<0.01
Vis., cSt @ 130° F.: 17.53
Note: Pulai is contributor to Tapis Blend

Salawati, West Irian, Indonesia

Salawati marine terminal (breasting and mooring dolphins and storage barge) on Sele Strait

Crude
Gravity, °API: 38.0
Vis., cSt @ 100° F.: 4.2
Pour pt, °F.: −15
Rvp @ 100° F., psi: 0.6
Sulfur, wt %: 0.49
Wax content, wt %: 8.42
Con. carbon residue, wt %: 1.3
Charac. factor K UOP: 12.0

Gasoline
Range, °C.: C_5-94
Yield, vol %: 1.0

Naphtha
Range, °C.: 94-149
Yield, vol %: 10.7
Paraffins, vol %: 71.4
Naphthenes, vol %: 27.9
Aromatics, vol %: 0.8

Kerosine
Range, °C.: 149-260
Yield, vol %: 35.4
Smoke pt, mm: 35.5
Freezing pt, °F.: −28

Gas oil
Range, °C.: 260-344
Yield, vol %: 21.5
Cetane index: 58.6

Residue
Range, °C.: 344+
Yield, vol %: 31.4
Sulfur, wt %: 1.1
Pour pt, °F.: 115

Sanga Sanga, Kalimantan, Indonesia

Crude
Gravity, °API: 25.7
Rvp, psi @ 100° F.: 0.8
Sulfur, wt %: 0.17
Pour pt, °F.: +5
V/Ni, ppm: nil/0.9
Vis., SUS @ 100° F.: 151.3
Con. carbon residue, wt %: 0.79

Naphtha
Range, °F.: Ibp-350
Yield, vol %: 13.2
Rvp, psi @ 100° F.: 2.7
Sulfur, wt %: 0.015

Kerosine
Range, °F.: 350-450
Yield, vol %: 12.4
Aniline pt, °C.: 118
Sulfur, wt %: 0.04
Smoke pt, mm: 16

Diesel
Range, °F.: 450-650
Yield, vol %: 41.6
Gravity, °API: 25.3
Aniline pt, °C.: 133
Cetane index (calc.): 36.5
Sulfur, wt %: 0.13
Pour pt, °F.: +25
Vis., SUS @ 100° F.: 41.6

Fuel oil
Range, °F.: 650+
Yield, vol %: 32.8
Gravity, °API: 19.3
Sulfur, wt %: 0.31
Pour pt, °F.: +105
V/Ni, ppm: Nil/1.4

Sepinggan-Yakin Mixed (4:1), East Kalimantan, Indonesia

Lawi-Lawi terminal about 12 miles south of Balikpapan/SBM about 6 miles offshore in Makasar Straits

Crude
Gravity, °API: 31.7
Vis., cSt @ 100° F.: 3.16
Pour pt, °F.: 20
Rvp, psi @ 100° F.: 2.6
Total acid no., mg KOH/g: 0.3
Sulfur content, wt %: 0.11
Con. carbon residue, wt %: 0.54

Gasoline
Range, °C.: C_5-100
Yield, vol %: 1.5

Naphtha
Range, °C.: 100-175
Yield, vol %: 19.5

Kerosine
Range, °C.: 175-250
Yield, vol %: 21.5

Gas oil
Range, °C.: 250-350
Yield, vol %: 35.5

Fuel oil
Range, °C.: 350+
Yield, vol %: 22.0

Seria Light, Brunei

Lutong terminal

Crude
Gravity, °API: 36.2
Rvp, psi: 6.0
Sulfur, wt %: 0.07
Pour pt, °F.: 35
Vis., SSU @ 80° F.: 36.5
Yield, Ibp-113° F., vol %: 5.77

Gasoline
Range, °F.: 113-220
Yield, vol %: 10.23
RON + 3 cc TEL/gal: 85.0

Naphtha
Range, °F.: 220-390
Yield, vol %: 21.41
Paraffins, vol %: 35.9
Naphthenes, vol %: 34.6
Dinaphthenes, vol %: 11.8
Aromatics, vol %: 17.7

Light distillate
Range, °F.: 390-550
Yield, vol %: 26.63
Gravity, °API: 33.0
Cetane index: 35.0
Sulfur, wt %: 0.04
Aniline pt, °F.: 129.5
Pour pt, °F.: −35
Range, °F.: 550-650
Yield, vol %: 13.88
Gravity, °API: 29.0

Light gas oil
Range, °F.: 450-650
Yield, vol %: 31.74
Gravity, °API: 30.1
Cetane index: 40.7
Sulfur, wt %: 0.07

Heavy gas oil
Range, °F.: 650-971
Yield, vol %: 18.89
Gravity, °API: 18.0
Sulfur, wt %: 0.15
Total nitrogen, ppm: 513
Basic nitrogen, ppm: 262
Pour pt, °F.: 95
Carbon residue, wt %: 0.18

Vacuum flashed residue
Range, °F.: 971+
Yield, vol %: 3.19
Gravity, °API: 10.0
Sulfur, wt %: 0.32

Shengli, China

Qingdao terminal on Yellow Sea

Crude
Gravity, °API: 24.2
Rvp, psi: 0
Sulfur, wt %: 1.00
Pour pt, °F.: +70
Vis., SFS @ 122° F.: 48.3
Acid no.: 1.16

Light ends
Range, °F.: Ibp-160
Yield, vol %: 2.0

Light naphtha
Range, °F.: 160-290
Yield, vol %: 3.3
Paraffins, vol %: 45.9
Naphthenes, vol %: 44.7
Aromatics, vol %: 9.4

Heavy naphtha
Range, °F.: 290-390
Yield, vol %: 3.7
Gravity, °API: 47.5
Sulfur, wt %: 0.05
P/N/A, vol %: 48.9/30.9/20.2

Kerosine
Range, °F.: 390-500
Yield, vol %: 6.2
Gravity, °API: 39.9
Sulfur, wt %: 0.23
Olefins, vol %: 0.9
Aromatics, vol %: 16.5
Smoke pt, mm: 17
Freeze pt, °F.: −29.2

Diesel
Range, °F.: 500-660
Yield, vol %: 12.3
Gravity, °API: 34.7
Sulfur, wt %: 0.53
Pour pt, °F.: +40
Cetane index: 52.6
Cloud pt, °F.: +42

Light gas oil
Range, °F.: 660-780
Yield, vol %: 9.7
Gravity, °API: 31.4
Sulfur, wt %: 0.65
Vis., SSU @ 100° F.: 76.0
Pour pt, °F.: +80
Aniline pt, °F.: 183.0
UOP K factor: 12.1
Carbon residue, wt %: 0.06

Heavy gas oil
Range, °F.: 780-1,050
Yield, vol %: 26.4
Gravity, °API: 24.8
Sulfur, wt %: 0.79
Vis., SSU @ 210° F.: 78.3
Pour pt, °F.: +110
Aniline pt, °F.: 202.0
Carbon residue, wt %: 0.28

Bottoms
Range, °F.: 1,050+
Yield, vol %: 36.4
Gravity, °API: 11.7
Sulfur, wt %: 1.66
Vis., SSF @ 210° F.: 1,097.8
Carbon residue, wt %: 16.4

Soviet Export Blend, U.S.S.R.

Terminals: Ventspils, Baltic and Novorossysk, Black Sea

Crude
Gravity, °API: 32.5
Sulfur, wt %: 1.38
Rvp, kPa: 49.2
Pour pt, °C: −23
Vis. @ 20° C.: 11.5

Light naphtha
Range (TBP), °C.: Ibp-90
Yield, wt %: 10.3
Density @ 15° C., g/ml: 0.676
Sulfur, wt %: 0.005
Paraffins, wt %: 71.7
Naphthenes, wt %: 26.5
Aromatics, wt %: 1.8

Heavy naphtha
Range (TBP), °C.: 90-180
Yield, wt %: 11.3
Density @ 15 °C., g/ml: 0.761
Sulfur, wt %: 0.029
P/N/A, vol %: 38.5/52.0/9.5

Kerosine
Range (TBP), °C.: 180-220
Yield, wt %: 6.5
Density @ 15 °C., g/ml: 0.806
Sulfur, wt %: 0.15
Aromatics, vol %: 20.1
Freeze pt, °C.: −57
Smoke pt, mm: 25
Aniline pt, °C.: 62.5
Vis., cSt @ 20° C.: 1.73

Light gas oil
Range (TBP), °C.: 180-350
Yield, wt %: 24.3
Density @ 15° C., g/ml: 0.840
Cetane index (calc.): 49.5
Sulfur, wt %: 0.57
Pour pt, °C.: −29
Aniline pt, °C.: 67.5
Vis., cSt @ 20° C.: 3.69

Heavy gas oil
Range (TBP), °C.: 350-515
Yield, wt %: 29.4
Density @ 15° C., g/ml: 0.915
Sulfur, wt %: 1.9
Vis., cSt @ 50° C.: 26.0
V/Ni, ppm: 0.15/0.17

Long residuum
Range, °C.: 350
Yield, wt %: 54.1
Density @ 15° C., g/ml: 0.952
Sulfur, wt %: 2.59
Rams. carbon, wt %: 8.2
Vis., cSt @ 50° C.: 191

Short residuum
Range, °C.: 515
Yield, wt %: 26.4
Sulfur, wt %: 2.98
Rams. carbon, wt %: 16.4
Vis. @ 60° C.: 3.9
V/Ni, ppm: 154/53

Note: Crude on which this assay was based was shipped from Ventspils. It is claimed that crude from either port is of similar quality.

Taching (Daqing), China

Luda (Darien) terminal on Yellow Sea

Crude
Gravity, °API: 33.0
Sulfur, wt%: .078
Pour pt, °F.: +95

Light ends
Range, °F.: Ibp-160
Yield, vol %: 1.8

Light naphtha
Range, °F.: 160-290
Yield, vol %: 5.4
Sulfur, wt %: 0.0130
Paraffins, vol %: 46.6
Olefins, vol %: 0.4
Naphthenes, vol %: 50.4
Aromatics, vol %: 2.6

Heavy naphtha
Range, °F.: 290-390
Yield, vol %: 5.8

Sulfur, wt %: 0.010
P/O/N/A, vol %: 39.6/1.5/52.4/6.5

Kerosine
Range, °F.: 390-500
Yield, vol %: 7.7
Gravity, °API: 44.0
Sulfur, wt %: 0.0127
Olefins, vol %: 3.2
Aromatics, vol %: 11.1
Smoke pt, mm: 22
Freezing pt, °F.: −13.9

Diesel
Range, °F.: 500-635
Yield, vol %: 7.2
Gravity, °API: 39.2
Sulfur, wt %: 0.0390
Vis., SSU @ 100° F.: 40.2
Pour pt, °F.: +40
Aniline pt, °F.: 178.0
Diesel index: 69.8

Light gas oil
Range, °F.: 635-775
Yield, vol %: 16.3
Gravity, °API: 37.0
Sulfur, wt %: 0.0480
Vis., SSU @ 100° F.: 52.1
Pour pt, °F.: +80
Carbon residue, wt %: 0.01

Heavy gas oil
Range, °F.: 775-932
Yield, vol %: 18.9
Gravity, °API: 31.4
Sulfur, wt %: 0.1140
Vis., SSU @ 210° F.: [illegible]
Pour pt, °F.: +115
UOP K factor: 12.5
Carbon residue, wt%: 0.03

Bottoms
Range, °F.: 932+
Yield, vol %: 36.9
Gravity, °API: 21.2
Sulfur, wt %: 0.14
Vis., SSF @ 210° F.: 52.2
Carbon residue, wt %: 7.3
V/Ni, ppm: 1.0/0

Tapis, Malaysia

Piped ashore to terminal north of Chukai, Kuala Trengganu area, peninsular Malaysia, as part of Tapis Blend

Crude
Gravity, °API: 44.30
Vis., cSt @ 70° F.: 2.69
Pour pt, °F.: 39
Sulfur, ppm: 230
Total nitrogen, ppm: 134
Basic nitrogen, ppm: 10.1
Neut. no., mg KOH/g: 0.04
Rvp, psi: 2.5
Con. carbon residue, wt %: 2.17
V/Ni, ppm: <0.002/0.17
Wax content, wt %: 5.75
Asphaltene content, wt %: 0.112
Yield, C_4 & lighter, vol %: 0.97

Light gasoline
Range, °F.: C_5-145
Yield, vol %: 2.97
Sulfur, ppm: <5
Rvp, psi: 10.4
RON, clear: 74
RON + 3 cc TEL/U.S. gal: 92.5
Paraffins, wt %: 84.15
Naphthenes, wt %: 13.22
Aromatics, wt %: 2.63

Heavy naphtha
Range, °F.: 145-330
Yield, vol %: 23.47
Sulfur, ppm: 13
RON, clear: 53
P/N/A, wt %: 40.26/31.08/28.66

Kerosine
Range, °F.: 330-450
Yield, vol %: 20.70
Sulfur, ppm: 23
Freezing pt, °F.: −40
Smoke pt, mm: 20
Cetane index: 55.87
Diesel index: 74

Light distillate
Range, °F.: 450-650
Yield, vol %: 34.27
Gravity, °API: 41.0
Sulfur, ppm: 135
Cetane index: 61.9
Aniline pt, °C.: 79.5
Vis., SUS @ 70° F.: 41.35

Residue
Range, °F.: 650+
Yield, vol %: 17.62
Gravity, °API: 29.58
Sulfur, ppm: 700
Pour pt, °F.: 108
Con. carbon residue, wt %: 2.024
V/Ni, ppm: 0.31/0.01
Vis., SUS @ 130° F.: 102.31

Note: Tapis is contributor to Tapis Blend

Tapis Blend, Malaysia

Piped ashore to terminal north of Chukar, Kuala Trengganu area, peninsular Malaysia

Tapis Blend comprises oil from six fields in the South China Sea. They are Tapis, Pulai, Bekok, Tiong, Tingge, and Kepong. The latter three fields only recently began contributing to blend and assays had not yet been run at mid 1983. Tapis crude originally made up 60% of blend, Pulai and Bekok 40%. Assays are presented for these three crudes.

Tembungo, Sabah, Malaysia

Production platform in offshore producing area

Crude
Gravity, °API: 37.4
Sulfur, wt %: 0.04
Pour pt, °F.: +25
Vis., cSt @ 100° F.: 2.0
Rvp, psi: 2.8
Salt content, lb/1,000 bbl: 2.3

Light naphtha
Range, °F.: C_5-160
Yield, vol %: 2.4
Gravity, °API: 81.0
Sulfur, wt %: 0.001
Rvp, psi: 12.6
Paraffins, vol %: 83.0
Naphthenes, vol %: 17.0
Aromatics, vol %: Nil

Heavy naphtha
Range, °F.: 160-300
Yield, vol %: 17.9
Gravity, °API: 53.0
Sulfur, wt %: 0.004
Paraffins, vol %: 27.0
Naphthenes, vol %: 59.0
Aromatics, vol %: 14.0

Light distillate
Range, °F.: 300-510
Yield, vol %: 35.7
Gravity, °API: 36.0
Sulfur, wt %: 0.04
Freeze point, °F.: −45 est.
Smoke pt, mm: 13.0
Paraffins, vol %: 30.0
Naphthenes, vol %: 36.0
Aromatics, vol %: 34.0

Heavy distillates
Range, °F.: 510-650
Yield, vol %: 28.9
Gravity, °API: 33.0
Sulfur, wt %: 0.06
Pour pt, °F.: +15.0
Aniline pt, °F.: 153.0
Diesel index: 50.5

Resid
Range, °F.: 650+
Yield, vol %: 13.5
Gravity, °API: 25.0
Sulfur, wt %: 0.14
Pour pt, °F.: 85.0
Vis., cSt @ 100° F.: 42.0
Con. carbon, wt %: 0.55

Udang, Natuna Sea, Indonesia

Storage vessel with SBM about 43 nautical miles north of Anambas Island

Crude
Gravity, °API: 38.0
Kin. vis. @ 130° F.: 8.71
Con. carbon residue, wt %: 3.0
Sulfur, wt %: 0.05
V/Ni, ppm: 0.9/3.5
Pour pt, °C.: +37.8
Rvp, psi: nil
C_4 & lighter, vol %: 0.36

Naphtha
Range (TBP), °F.: 90-375
Yield, vol %: 15.2
Gravity, °API: 63.3
Paraffins, vol %: 75.5
Naphthenes, vol %: 20.3
Sulfur, wt %: <0.005

Kerosine
Range, °F.: 375-520
Yield, vol %: 11.4
Gravity, °API: 47.7
Sulfur, wt %: 0.005
Aromatics, vol %: 6

Heavy distillate
Range, °F.: 520-700
Yield, vol %: 18.7
Gravity, °API: 41.6
Sulfur, wt %: 0.02

Gas oil
Range, °F.: 700-1,010
Yield, vol %: 34.6
Gravity, °API: 35.4
Sulfur, wt %: 0.04

Residue
Range, °F.: 1,010+
Yield, vol %: 19.7
Gravity, °API: 20.9
Sulfur, wt %: 0.10
Kin. vis. @ 210° F.: 150
Con. carbon residue, wt %: 12.2
V/Ni, ppm: 4/16

Walio, West Irian, Indonesia

Kasim marine terminal (CBM) between island of Jef Kasim and mainland Irian Jaya

Crude
Gravity, °API: 34.05
Vis., cSt @ 100° F.: 5.0
Rvp @ 100° C., psi: 3.7
Acid no., mg KOH/g: 0.30
Con. carbon residue, wt %: 2.18
Charac. factor K UOP: 11.7

Gasoline
Range, °C.: C_5-95
Yield, vol %: 4.5

Naphtha
Range, °C.: 95-185
Yield, vol %: 19.0
Paraffins, vol %: 63.3
Naphthenes, vol %: 30.7
Aromatics, vol %: 6.0

Kerosine
Range, °C.: 185-260
Yield, vol %: 16.7
Smoke pt, mm: 22.0
Freezing pt, °C.: −46

Gas oil
Range, °C.: 260-350
Yield, vol %: 20.0
Diesel index: 56.1

Fuel oil
Range, °C.: 350+
Yield, vol %: 39.8
Sulfur, wt %: 1.36
Pour pt, °F.: 100

Latin America

BCF 24, Venezuela

La Salina, Lake Maracaibo

Crude
Gravity, °API: 23.5
Sulfur, wt %: 1.85
Vis., SUS @ 100° F.: 192.2
Pour pt, °F.: −60
Yield, 0°(IVT) - −82° F., vol %: 1.53

Light naphtha
Range, °F.: 82-200
Yield, vol %: 3.80
Sulfur, wt %: 0.0011
Paraffins, %: 71.37
Naphthenes, %: 26.70
Aromatics, %: 1.93

Heavy naphtha
Range, °F.: 200-300
Yield, vol %: 5.0
Sp gr: 0.7565
Sulfur, wt %: 0.0066
P/N/A, %: 48.24/39.87/11.89
RON clear: 65.4

Naphtha
Range, °F.: 300-350
Yield, vol %: 2.82
P/N/A, %: 41.95/42.21/15.84

Kerosine
Range, °F.: 350-400
Yield, vol %: 3.14
P/N/A, %: 37.59/44.45/17.95
Sulfur, wt %: 0.1186
Freeze pt, °F.: −91.39
Smoke pt, mm: 22.25
Cetane no.: 46.06
Aniline pt, °F.: 128.05

Gas oil
Range, °F.: 400-500
Yield, vol %: 7.53
Gravity, °API: 37.37
Sulfur, wt %: 0.3027
Kin. vis. @ 122° F.: 1.51
Freeze pt, °F.: −63.27
Smoke pt, mm: 19.33
Aniline pt, °F: 136.44
Cetane no.: 42.20

Gas oil
Range, °F.: 500-550
Yield, vol %: 4.55

Gas oil
Range, °F.: 550-650
Yield, vol %: 9.73
Sulfur, wt %: 1.06
Gravity, °API: 29.07
Kin. vis. @ 122° F.: 4.62
Pour pt, °F.: 4.13
Smoke pt, mm: 7.22
Aniline pt, °F.: 150.73

Residue
Range, °F.: 650+
Yield, vol %: 61.91
Gravity, °API: 13.26
Sulfur, wt %: 2.58
Kin. vis. @ 122° F.: 2,295
Ni/V, ppm: 40/347

Bachaquero, Venezuela

La Salina, Lake Maracaibo

Crude
Gravity, °API: 16.8
Sulfur, wt %: 2.4
Vis., SUS @ 100° F.: 1,362
Pour pt, °F.: −10
Rvp, psi: 1.6
Yield, 0° (IVT) - −82° F., vol %: 0.80

Light naphtha
Range, °F.: 82-200
Yield, vol %: 2.44
Sulfur, wt %: 0.0075
Paraffins, %: 66.17
Naphthenes, %: 31.28
Aromatics, %: 2.55
RON clear: 71.7

Heavy naphtha
Range, °F.: 200-300
Yield, vol %: 3.54
Sulfur, wt %: 0.026
P/N/A, wt %: 29.38/58.96/11.66
RON clear: 66.7

Naphtha
Range, °F. 300-350
Yield, vol %: 1.81
Sp gr: 0.8018
Sulfur, wt %: 0.1107
P/N/A, %: 23.20/59.59/17.21

Kerosine
Range, °F.:350-400
Yield, vol %: 2.11
Sp gr: 0.8227
Sulfur, wt %: 0.19
P/N/A, %: 25.12/54.49/20.39
Freeze pt, °F.: −74.12
Smoke pt, mm: 17.75
Cetane no.: 48.56

Gas oil
Range, °F.: 400-500
Yield, vol %: 6.37
Gravity, °API: 35.43
Sulfur, wt %: 0.52
Aromatics, wt %: 25.29
Freeze pt, °F.: −66.62
Smoke pt, mm: 9.23
Cetane no.: 46.36
Aniline pt., °F.: 127.39
Cetane index: 39.98

Gas oil
Range, °F.: 500-550
Yield, vol %: 3.93

Gas oil
Range, °F.: 550-650
Yield, vol %: 8.95
Sulfur, wt %: 1.36
Pour pt, °F.: −47.99
Smoke pt, mm: 2.83
Aniline pt, °F.: 138.64

Residue
Range, °F.: 650+
Yield, vol %: 70.24
Gravity, °API: 9.39
Sulfur, wt %: 3.0
Kin. vis. @ 122° F.: 8,672
Ni/V, ppm: 74/435

Boscan, Venezuela

Bajo Grande, Lake Maracaibo

Crude
Gravity, °API: 10.10
Sulfur, wt %: 5.5
Vis. SUS @ 100° F.: 90,000
Pour pt, °F.: +50

Light naphtha
Range, °F.: 82-200
Yield, vol %: 0.55

Heavy naphtha
Range, °F.: 200-300
Yield, vol %: 1.32
Sulfur, wt %: 0.68
Paraffins, %: 53.28

Naphtha
Range, °F.: 300-350
Yield, vol %: 0.88
Sulfur, wt %: 1.28
Paraffins, %: 34.9

Kerosine
Range, °F.: 350-400
Yield, vol %: 1.28
Sulfur, wt %: 1.88
Aromatics, %: 24.04
Pour pt, °F.: −141.0
Smoke pt, mm: 16.0
Aniline pt, °F.: 112.69

Gas oil
Range, °F.: 400-500
Yield, vol %: 3.96
Gravity, °API: 34.0
Sulfur, wt %: 3.14
Kin. vis. @ 122° F.: 1.81
Pour pt, °F.: −77.53
Smoke pt, °F.: 16.11

Aniline pt, °F.: 113.83
Cetane index: 37.24

Gas oil
Range, °F.: 500-550
Yield, vol %: 2.66
Gravity, °API: 28.62
Sulfur, wt %: 4.02

Gas oil
Range, °F.: 550-650
Yield, vol %: 6.46
Gravity, °API: 25.54
Sulfur, wt %: 4.47
Pour pt, °F.: −10.9
Cetane no.: 38.0
Aniline pt, °F.: 117.3
Cetane index: 42.27

Residue
Range, °F.: 650+
Yield, vol %: 82.9
Sulfur, wt %: 5.86
Gravity, °API: 6.10
Sulfur, wt %: 5.86
Ni/V, ppm: 175/1,407
Kin. vis. @ 122° F.: 22,502

Ceuta, Venezuela

Puerto Miranda, Lake Maracaibo

Crude
Gravity, °API: 31.8
Sulfur, wt %: 1.2
Vis., SUS @ 100° F.: 62
Pour pt, °F.: −35
Rvp: 2.7
Yield, 0°(IVT) - −82° F., vol %: 2.10

Light naphtha
Range, °F.: 82-200
Yield, vol %: 7.51
Sulfur, wt %: 0.002
Paraffins, %: 75.69
Naphthenes, %: 19.85
Aromatics, %: 4.46
RON clear: 71.5

Heavy naphtha
Range, °F.: 200-300
Yield, vol %: 9.89
Sulfur, wt %: 0.01
P/N/A, %: 50.88/32.07/17.05
RON clear: 60.9

Naphtha
Range, °F.: 300-350
Yield, vol %: 5.36
P/N/A, %: 42.25/38.78/18.98

Kerosine
Range, °F.: 350-400
Yield, vol %: 5.28
Gravity, °API: 44.1
Sulfur, wt %: 0.054
P/N/A, %: 39.8/41.1/19.0
Smoke pt, mm: 21.39
Aniline pt, °F.: 122.8
Cetane index: 40.9

Gas oil
Range, °F.: 400-500
Yield, vol %: 9.93
Gravity, °API: 38.75
Sulfur, wt %: 0.33
Aromotics, %: 19.10
Smoke pt, mm: 19.59
Aniline pt, °F.: 136.18
Cetane index: 41.84

Gas oil
Range, °F.: 500-550
Yield, vol %: 5.0
Gravity, °API: 34.64
Sulfur, wt %: 0.72

Gas oil
Range, °F.: 550-650
Yield, vol %: 9.24
Gravity, °API: 30.17
Sulfur, wt %: 1.0
Aniline pt, °F.: 155.8
Cetane index: 48.03

Residue
Range, °F.: 650+
Yield, vol %: 45.69
Gravity, °API: 16.60
Sulfur, wt %: 2.05
Ni/V, ppm: 54/281

Galeota Mix (Trinidad Blend), Trinidad Tobago

Point Galeota SBM

Crude
Gravity, °API: 32.8
Sulfur, wt %: 0.27
Rvp, psi: 2.0
Pour pt, °F.: −5
Neut. no., mg KOH/g: 0.84
Rams. carbon, wt %: 0.5
Kin. vis., cSt @ 100° F.: 4.32
V/Ni, ppm: 0/1
Yield C_4 & lighter, vol %: 0.6

Naphtha
Range, °F.: C_5-200
Yield, vol %: 3.7
Sulfur, wt %: 0.010
Paraffins, vol %: 63.1
Naphthenes, vol %: 30.5
Aromatics, vol %: 6.4
RON clear: 73.1

Heavy naphtha
Range, °F.: 200-320
Yield, vol %: 8.7
Sulfur, wt %: 0.017
P/N/A, vol %: 39.4/44.9/15.7
RON clear: 63.8

Kerosine
Range, °F.: 320-520
Yield, vol %: 28.8
Gravity, °API: 36.6
Sulfur, wt %: 0.054
Aniline pt, °F.: 126.7
Diesel index: 46.3
Cetane index: 35.6
Freeze pt, °F.: −56
Smoke pt, mm: 20

Gas oil
Range, °F.: 520-650
Yield, vol %: 25.6
Gravity, °API: 30.3
Sulfur, wt %: 0.223
Aniline pt, °F.: 151.0
Diesel index: 45.8
Cetane index: 44.6
Pour pt, °F.: 11

Gas oil
Range, °F.: 650-850
Yield, vol %: 20.1
Gravity, °API: 26.6
Sulfur, wt %: 0.454
Nitrogen, wt %: 0.030
Vis., SUS @ 122° F.: 77.8

Residue
Range, °F.: 650+
Yield, vol %: 32.8
Gravity, °API: 24.2
Sulfur, wt %: 0.607
Pour pt, °F.: +65
Nitrogen, wt %: 0.086
Rams. carbon, wt %: 1.35
Vis., SUS @ 122° F.: 200.3
V/Ni, ppm: 1/1

Isthmus, Mexico

Pajaritos, Veracruz, and Salina Cruz (Pacific), Oaxaca

Crude
Gravity, °API @ 60° F.: 32.8
Sulfur, wt %: 1.51
Pour test, °F.: −15
Vis., SUS @ 70° F.: 65.53
Vis., SUS @ 100° F.: 43.91
Rvp, psi @ 100° F.: 6.4
Hydrogen sulfide, ppm: 102
NC_4 & lighter, wt %: 1.2

Light straight run
Range, °F.: 60-200
Yield, vol %: 9.1
Total sulfur, wt %: 0.046
RON clear: 62.6
RON + 3 ml TEL/gal: 82.4

Naphtha
Range, °F.: 60-400
Yield, vol %: 29.9
Paraffins, vol %: 64.40
Naphthenes, vol %: 21.02
Aromatics, vol %: 14.58
Total sulfur, wt %: 0.054
RON clear: 44.5
RON + 3 ml TEL/gal: 67.0

Kerosine
Range, °F.: 400-500
Yield, vol %: 12.5
Gravity, °API: 41.2
Freezing point, °F.: −36
P/N/A, vol %: 47.4/30.9/21.7
Total sulfur, wt %: 0.23
Aniline pt, °F.: 143.2
Smoke pt, mm: 22

Light gas oil
Range, °F.: 500-650
Yield, vol %: 16.0
Gravity, °API: 32.3
Pour pt, °F.: +25
P/N/A, vol %: 41.2/33.3/25.5
Total sulfur, wt %: 1.19
Carbon residue, Rams., wt %: 0.01
Aniline pt, °F.: 156.3
Cetane index: 52.5

Topped crude
Range, °F.: 650+
Yield, vol %: 40.4
Gravity, °API: 15.5
Vis., SUS @ 210° F.: 145.47
Vis., SUS @ 122° F.: 149.53
Pour pt, °F.: +55
Total sulfur, wt %: 2.94
Carbon residue, Rams., wt %: 8.08
Nitrogen, %: 0.2065
Ni/V, ppm: 14.8/67.1

Vacuum gas oil
Range, °F.: 650-1,100+
Yield, vol % (of crude): 28.5
Gravity, °API: 19.7
Aniline pt, °F.: 181.1
Vis., SUS @ 130° F.: 207.09
Pour pt, °F.: +110
Sulfur, wt %: 2.45
Carbon residue, Rams., wt %: 0.97
Ni/V, ppm: 4.3/-

Vacuum residue
Range, °F.: 1,100+
Yield, vol % (of crude): 11.9
Gravity, °API: 4.2
Vis., SFS @ 275° F.: 235.8
Sulfur, wt %: 4.18
Carbon residue, wt %: 23.08
Ni/V, ppm: 37/210

Lagomedio, Venezuela

Punta Palmas, Puerto Miranda/La Salina, Lake Maracaibo

Crude
Gravity, °API: 31.50
Sulfur, wt %: 1.17
Vis., SUS @ 100° F.: 56
Pour pt, °F.: −15
Rvp: 5.3
Yield, 0°(IVT) - −82° F., vol %: 1.96

Light naphtha
Range, °F.: 82-200
Yield, vol %: 6.10
Paraffins, %: 77.35
Naphthenes, %: 20.38
Aromatics, %: 2.28
RON clear: 65.6

Heavy naphtha
Range, °F.: 200-300
Yield, vol %: 9.27
Sulfur, wt %: 0.0
P/N/A, %: 55.4/33.0/11.5

Naphtha
Range, °F.: 300-350
Yield, vol %: 5.0
P/N/A, %: 50.0/32.5/17.5

Kerosine
Range, °F.: 350-400
Yield, vol %: 4.95
Sulfur, wt %: 0.027
Aromatics, %: 19.5
Smoke pt, mm: 24.5
Cetane no.: 56.12
Cetane index: 47.2

Gas oil
Range, °F.: 400-500
Yield, vol %: 9.39
Gravity, °API: 40.65
Sulfur, wt %: 0.17
Aromatics, %: 19.7
Smoke pt, mm: 20.61
Cetane no.: 50.02
Aniline pt, °F.: 147.34
Cetane index: 50.3

Gas oil
Range, °F.: 500-550
Yield, vol %: 4.69
Gravity, °API: 36.9
Sulfur, wt %: 0.44

Gas oil
Range, °F.: 550-650
Yield, vol %: 9.49
Gravity, °API: 33.4
Sulfur, wt %: 0.78
Cetane no.: 54.81
Aniline pt, °F.: 166.46
Cetane index: 58.1

Residue
Range, °F.: 650+
Yield, vol %: 49.15
Gravity, °API: 18.16
Sulfur, wt %: 1.97
Ni/V, ppm: 20/180

La Rosa Medium, Venezuela

La Salina, Lake Maracaibo

Crude
Gravity, °API: 25.3
Sulfur, wt %: 1.73
Pour pt, °F.: < −50
Rvp, psi: 4.0
Neut. no., mg KOH/g: 0.90
Vis. kin., cSt @ 122° F.: 24.0
Yield, C_5 & lighter: 1.34

Distillation

°F.	**Yield, vol %:**	
	On crude	Cum.
C_2-C_5	1.34	1.34
158	2.47	3.80
212	2.33	6.13
302	5.40	11.52
401	6.69	18.21
509	7.81	26.01
650	13.22	39.23
698	5.63	44.85
752	6.33	51.17
752+	48.83	100.00

Residue
Range, °F.: 752+
Yield, vol %: 48.83
Gravity, °API: 12.1
Sulfur, wt %: 2.63
Con. carbon, wt %: 12.85
V/Ni, ppm: 413/43
Kin. vis., cSt @ 140° F.: 2,397

Leona, Venezuela

Puerto La Cruz, State of Anzoategui

Crude
Gravity, °API: 24.1
Sulfur, wt %: 1.5
Vis., SUS @ 122° F.: 305
Pour pt, °F.: −45
Rvp: 5.5
Yield, 0°(IVT)-82° F., vol %: 0.99

Naphtha
Range, °F.: 82-200
Yield, vol %: 4.34
RON clear: 63.9

Heavy naphtha
Range, °F.: 200-300
Yield, vol %: 6.71
Sulfur, wt %: 0.005
Paraffins, %: 49.85
Naphthenes, %: 32.13
Aromatics, %: 18.01

Naphtha
Range, °F.: 300-350
Yield, vol %: 3.34

Kerosine
Range, °F.: 350-400
Yield, vol %: 3.39
Sulfur, wt %: 0.05
P/N/A, %: 34.6/43.9/21.5
Smoke pt, mm: 18.15
Cetane no.: 44.78
Aniline pt, °F.: 135.13
Cetane index: 43.23

Gas oil
Range, °F.: 400-500
Yield, vol %: 10.51
Gravity, °API: 36.39
Sulfur, wt %: 0.19
Smoke pt, mm: 16.14
Cetane no.: 50.18
Aniline pt, °F.: 149.11
Cetane index: 46.50

Gas oil
Range, °F.: 500-550
Yield, vol %: 5.31
Sulfur, wt %: 0.56

Gas oil
Range, °F.: 550-650
Yield, vol %: 10.32
Gravity, °API: 28.46
Sulfur, wt %: 0.92
Pour pt, °F.: 17.79

Residue
Range, °F.: 650+
Yield, vol %: 55.11
Gravity, °API: 12.28
Sulfur, wt %: 2.3
Ni/V, ppm: 26/176

Loreto, Peru

Puerto Bayovar

Crude
Gravity, °API: 34.0
Sulfur, wt %: 0.29
Pour pt, °F.: 34
Vis., SUS @ 80° F.: 53.3
V/Ni, ppm: 63/34

Light naphtha
Range, °C.: Ibp-45
Yield, vol %: 2.41

Naphtha
Range, °C.: 45-104
Yield, vol %: 7.11
Paraffins, vol %: 68.3
Naphthenes, vol %: 29.9
Aromatics, vol %: 1.8

Heavy naphtha
Range, °C.: 104-199
Yield, vol %: 18.24
P/N/A, vol %: 49.9/39.2/10.3

Kerosine
Range, °C.: 199-288
Yield, vol %: 18.95
Sulfur, wt %: 0.05
Pour pt, °C.: −37
Cetane index: 46.3

Residue
Range, °C.: 343+
Yield, vol %: 41.3
Gravity, °API: 18.9
Sulfur, wt %: 0.51

Maya, Mexico

Pajaritos, Veracruz and Salina Cruz (Pacific), Oaxaca

Crude
Gravity, °API @ 60° F.: 22.0
Sulfur, wt %: 3.32
Pour test, °F.: 0
Vis., SUS @ 70° F.: 1,024.57
Vis., SUS @ 100° F.: 333.62
Rvp, psi @ 100° F.: 4.7
Hydrogen sulfide, ppm: 199
NC_4 & lighter, vol %: 1.5

Light straight run
Range, °F.: 60-200
Yield, vol %: 5.2
Total sulfur, wt %: 0.025
RON clear: 57.7
RON + 3 ml TEL/gal: 80.9

Naphtha
Range, °F.: 60-400
Yield, vol %: 19.7
Paraffins, vol %: 60.60
Naphthenes, vol %: 27.03
Aromatics, vol %: 12.37
Total sulfur, wt %: 0.213
RON clear: 38.1
RON + 3 ml TEL/gal: 57.6

Kerosine
Range, °F.: 400-500
Yield, vol %: 9.6
Gravity, °API: 39.6
Freezing pt, °F.: −29
P/N/A, vol %: 45.4/33.7/20.9
Total sulfur, wt %: 1.16
Aniline pt, °F.: 142.2
Smoke pt, mm: 20

Light gas oil
Range, °F.: 500-650
Yield, vol %: 12.8
Gravity, °API: 30.6
Pour pt, °F.: +30
P/N/A, vol %: 36.8/34.1/29.1
Total sulfur, wt %: 2.17
Carbon residue, Rams., wt %: 0.08
Aniline pt, °F.: 152.8
Cetane index: 51.0

Topped crude
Range, °F.: 650+
Yield, vol %: 56.4
Gravity, °API: 7.7
Vis., SUS @ 210° F.: 3,370.63
Vis., SUS @ 122° F.: 23,755.00
Pour pt, °F.: +115
Total sulfur, wt %: 5.04
Carbon residue, Rams., wt %: 17.83
Nitrogen, %: 0.4245
Ni/V, ppm: 87.8/535.0

Vacuum gas oil
Range, °F.: 650-1,100+
Yield, vol % (of crude): 25.2
Gravity, °API: 18.3
Aniline pt, °F.: 167.4
Vis., SUS @ 130° F.: 270.17
Pour pt, °F.: +105
Sulfur, wt %: 3.14
Carbon residue, Rams., wt %: 0.69
Ni/V, ppm: 0.9/1.9

Vacuum residue
Range, °F.: 1,100+
Yield, vol % (of crude): 31.2
Gravity, °API: 0.5
Vis., SUS @ 275° F.: Too hard
Sulfur, wt %: 5.78
Carbon residue, Rams., wt %: 26.2
Ni/V, ppm: 149/913

Merey, Venezuela

Puerto La Cruz, State of Anzoategui

Crude
Gravity, °API: 17.4
Sulfur, wt %: 2.2
Vis., SUS @ 100° F.: 1,207
Pour pt, °F.: −10
Yield, 0°(IVT)-82° F., vol %: 0.54

Light naphtha
Range, °F.: 82-200
Yield, vol %: 1.61
RON clear: 74.7

Heavy naphtha
Range, °F.: 200-300
Yield, vol %: 3.21
Sulfur, wt %: 0.01
Paraffins, vol %: 43.9
Naphthenes, vol %: 41.55
Aromatics, vol %: 15.17

Naphtha
Range, °F.: 300-350
Yield, vol %: 1.91
Sulfur, wt %: 0.036
P/N/A, vol %: 43.19/42.30/14.50

Kerosine
Range, °F.: 350-400
Yield, vol %: 2.37
Sulfur, wt %: 0.09
Aromatics, vol %: 13.95
Smoke pt, mm: 21.37
Aniline pt, °F.: 126.6

Gas oil
Range, °F.: 400-500
Yield, vol %: 7.21
Gravity, °API: 34.89
Sulfur, wt %: 0.33
Aromatics, vol %: 17.10
Smoke pt, mm: 13.45
Cetane no.: 35.62
Aniline pt, °F.: 135.51
Cetane index: 38.94

Gas oil
Range, °F.: 500-550
Yield, vol %: 4.52
Gravity, °API: 30.82
Sulfur, wt %: 0.7037

Gas oil
Range, °F.: 550-650
Yield, vol %: 10.47
Gravity, °API: 27.13
Sulfur, wt %: 1.15

Residue
Range, °F.: 650+
Yield, vol %: 68.16
Sulfur, wt %: 2.8
Ni/V, ppm: 74.77/301.08

Oriente, Ecuador

Puerto Balao/ Esmeraldas, Ecuador

Crude
Gravity, °API: 29.2
Sulfur, wt %: 1.01
Vis., cSt @ 104° F.: 13.0
Pour pt, °F.: 25.0
C_4 & lighter, vol %: 4.7
Rvp @ 100° F., psi: 3.70
Ni/V, ppm: 39/65

Light naphtha
Range, °F.: Ibp-200
Yield, vol %: 3.9
Sulfur, wt %: 0.001
Paraffins, vol %: 62.4
Naphthenes, vol %: 35.0
Aromatics, vol %: 2.6
RON clear: 67.3

Heavy naphtha
Range, °F.: 200-400
Yield, vol %: 17.3
Sulfur, wt %: 0.01
P/N/A, vol %: 44.9/45.8/9.3
RON clear: 45.9
Aniline pt, °F.: 130

Kerosine
Range, °F.: 400-500
Yield, vol %: 6.4
Gravity, °API: 40.6
Sulfur, wt %: 0.16
Vis., cSt @ 104° F.: 1.78
Smoke pt, mm: 20
Freezing pt, °F.: −41
Aniline pt, °F.: 142

Gas oil
Range, °F.: 500-620
Yield, vol %: 14.7
Gravity, °API: 35.1
Sulfur, wt %: 0.49
Vis., cSt @ 104° F.: 3.33
Pour pt, °F.: 5
Aniline pt, °F.: 153

Vacuum gas oil
Range, °F.: 620-1,000
Yield, vol %: 32.0
Gravity, °API: 25.2
Sulfur, wt %: 1.14
Vis., cSt @ 104° F.: 33.0
Pour pt, °F.: 90
Ni/V, ppm: 1/<1

Residue
Range, °F.: 620+
Yield, vol %: 51.5
Gravity, °API: 17.0
Sulfur, wt %: 1.66
Vis., cSt @ 104° F.: 649
Vis., cSt @ 212° F.: 34.1

Tia Juana Light, Venezuela

La Salina, State of Zulia

Crude
Gravity, °API: 32.1
Sulfur, wt %: 1.1
Kin. vis., SSU @ 100° F.: 60
Pour pt, °F.: −45
Yield, 0°(IVT)-82° F., vol %: 2.16

Light naphtha
Range, °F.: 82-200
Yield, vol %: 5.19

Heavy naphtha
Range, °F.: 200-300
Yield, vol %: 10.82
Sulfur, wt %: 0.0017
Paraffins, %: 65.99
Naphthenes, %: 24.30
Aromatics, %: 9.71
RON clear: 53.6

Naphtha
Range, °F.: 300-350
Yield, vol %: 4.82
Sulfur, wt %: 0.0077
P/N/A, %: 51.23/31.69/17.08

Kerosine
Range, °F.: 350-400
Yield, vol %: 4.64
Sulfur, wt %: 0.0281
P/N/A, %: 45.77/35.64/18.58
Smoke pt, mm: 23.37
Aniline pt, °F.: 134.99

Gas oil
Range, °F.: 400-500
Yield, vol %: 10.41
Gravity, °API: 40.72
Sulfur, wt %: 0.11
Smoke pt, mm: 14.99
Aniline pt, °F.: 147.31
Cetane index: 50.43

Gas oil
Range, °F.: 500-550
Yield, vol %: 4.96
Gravity, °API: 36.17
Sulfur, wt %: 0.4540
Smoke pt, mm: 11.99
Aniline pt, °F.: 158.47

Gas oil
Range, °F.: 550-650
Yield, vol %: 9.25
Gravity, °API: 32.39
Sulfur, wt %: 0.78
Smoke pt, mm: 14.42
Aniline pt, °F.: 168.05

Residue
Range, °F.: 650+
Yield, vol %: 47.75
Gravity, °API: 16.46
Sulfur, wt %: 1.87
Ni/V, ppm: 26/224

Tia Juana Pesado (Heavy), Venezuela

Puerto Miranda, Lake Maracaibo

Crude
Gravity, °API: 12.10
Sulfur, wt %: 2.7
Kin. vis., cSt @ 122° F.: 2.983
Pour pt, °F.: 30
Yield, 0°(IVT)-82° F., vol %: 0.08

Naphtha
Range, °F.: 82-200
Yield, vol %: 0.10

Heavy naphtha
Range, °F.: 200-300
Yield, vol %: 0.53
Sulfur, wt %: 0.209

Naphtha
Range, °F.: 300-350
Yield, vol %: 0.52
Sulfur, wt %: 0.21

Kerosine
Range, °F.: 350-400
Yield, vol %: 0.90
Sulfur, wt %: 0.24
Aromatics, %: 13.31
Smoke pt, mm: 20.53
Aniline pt, °F.: 122.34

Gas oil
Range, °F.: 400-500
Yield, vol %: 4.52
Gravity, °API: 31.9
Sulfur, wt %: 0.6
Smoke pt, mm: 13.26
Aniline pt, °F.: 128.0
Cetane no.: 32.46
Cetane index: 33.27

Gas oil
Range, °F.: 500-550
Yield, vol %: 3.12
Sulfur, wt %: 0.93

Gas oil
Range, °F.: 550-650
Yield, vol %: 7.92
Gravity, °API: 22.96
Sulfur, wt %: 1.51

Residue
Range, °F.: 650+
Yield, vol %: 82.15
Gravity, °API: 8.94
Sulfur, wt %: 3.0
V, ppm: 532

Bombay High, India

Floating storage in Arabian Sea producing area

Crude
Gravity, °API: 39.35
Rvp @ 38° C., kg/sq cm: 0.34
Pour pt, °C.: +30
Kin. vis., cSt @ 40° C.: 3.28
Sulfur, wt %: 0.17
Salt content, lb/1,000 bbl: 11
Con. carbon, wt %: 1.2
Wax (E.H.), wt %: 10.6
Yield, vol %: 20.6
Gravity, °API: 58.42
Charac. factor K UOP: 11.7
V/Ni/Fe, ppm: 0.3/1.0/<0.3

Naphtha
Range, °C.: C_5–150
Yield, wt %: 18.6
Rvp, Kg/sq cm @ 38° C.: 0.42
Sulfur, total, ppm: 3.0
Mercaptan sulfur, ppm: 1.3
Paraffins, vol %: 53.7
Napthenes, vol %: 25.0
Aromatics, vol %: 21.3
RON, clear: 69.6
RON + 0.56 g Pb/l as TEL: 82.1

Kerosine
Range, °C.: 140–240
Yield, wt %: 19.3
Yield, vol %: 19.6
Gravity, °API: 43.75
Sulfur, total, ppm: 66
Mercaptan sulfur, ppm: 1.5
Flash pt. (Abel), °C.: 46.5
Smoke pt, mm: 19
Freezing pt, °C.: − 54.0
Aniline pt, °C.: 52.2
Kin. vis., cSt @ − 30° C.: 4.18
P/N/A, vol %: 39.8/23.9/26.3

Gas oil
Range, °C.: 240–370
Yield, wt %: 25.6
Yield, vol %: 25.2
Gravity, °API: 34.25
Pour pt, °C.: + 3
Kin. vis., cSt @ 37.8° C.: 4.17
Sulfur, total, wt %: 0.14
Aniline pt, °C.: 73.2
Diesel index: 56

Vacuum gas oil
Range, °C.: 370–550
Yield, wt %: 29.3
Yield, vol %: 27.5
Gravity, °API: 29.86
Pour pt, °C.: + 51
Kin. vis., cSt @ 70° C.: 11.0
Kin. vis., cSt @ 98.9° C.: 5.65
Con. carbon, wt %: 0.17
Asphaltene, wt %: 0.06
V/Ni/Cu/Fe, ppm: <0.3/<0.3/<0.1/<0.3

Residue
Range, °C.: 370+
Yield, vol %: 34.6
Yield, vol %: 31.0
Gravity, °API: 21.24
Pour pt, °C.: + 51
Sulfur, total, wt %: 0.38
Kin. vis., cSt @ 98.9° C.: 14.37
Kin. vis., cSt @ 70° C.: 24.66
Con. carbon, wt %: 4.33
Asphaltene, wt %: 1.22
V/Ni/Cu/Fe, ppm: 0.8/2.8/<0.1/0.35

Residue
Range, °C.: 550+
Yield, wt %: 5.3
Yield, vol %: 3.5
Gravity, °API: 7.86
Pour pt, °C.: +78
Sulfur, total, wt %: 0.77
Kin. vis., cSt @ 98.9° C.: 1,396.58
Con. carbon, wt %: 23.70
Asphaltene, wt %: 8.40
V/Ni/Cu/Fe, ppm: 5.0/18.0/<0.1/1.9

North America

Bow River Heavy, Alberta

*Bow River Pipe Lines Ltd. to Edmonton**

Crude
Gravity, °API: 26.7
Sulfur, g/kg: 21.0
Rvp, kPa: 37.2
Pour pt, °C.: − 50.0
Con. carbon, wt %: 6.70
Vis., cSt @ 40° C.: 18.30
Ni/V, wt ppm: 20.7/54.0
C_3, yield, vol %: 0.41
C_4s, yield, vol %: 1.47

Naphtha
Range, °C.: C_5-190
Yield, vol %: 20.40
Sulfur, g/kg: 0.61
Paraffins, vol %: 65.50
Olefins, vol %: 0.40
Naphthenes, vol %: 26.80
Aromatics, vol %: 7.30

Kerosine
Range, °C.: 190-277
Yield, vol %: 13.10
Sulfur, g/kg: 4.40
P/O/N/A, vol %: 73.20/2.60/0.00/24.20
Aniline pt, °C.: 57.7
Pour pt, °C.: − 60.6
Cetane no.: 44.0
Cetane ~~index~~: 52.3
Smoke pt, mm: 27.0

Distillate
Range, °C.: 277-343
Yield, vol %: 10.80
Gravity, °API: 29.6
Sulfur, g/kg: 10.30
Aromatics, vol %: 55.10
Aniline pt, °C.: 63.9
Pour pt, °C.: − 35.0
Cetane no.: 46.0
Cetane index: 49.6
Vis., cSt @ 38° C.: 5.57

Gas oil
Range, °C.: 343-565°
Yield, vol %: 32.50
Gravity, °API: 20.9
Sulfur, g/kg: 21.00
Total nitrogen, wt %: 0.03
Pour pt, °C.: 12.1
Con. carbon, wt %: 0.60
Vis. cSt @ 38° C.: 57.30
Ni/V, ppm: 0.00/0.12

Residue
Range, °C.: 565+
Yield, vol %: 23.20
Gravity, °API: 5.3
Sulfur, g/kg: 38.20
Pour pt, °C.: 73.0
Vis., cSt @ 135° C.: 940
Penetration @ 25° C.: 19
Ni/V, wt ppm: 67.70/169.00

*Has access to Interprovincial and Trans Mountain pipelines at Edmonton

Cold Lake,* Alberta

Alberta Oil Sands Pipeline Ltd. to Edmonton†

Crude
Density, g/cu cm: 0.9031
Sulfur, wt %: 2.91
Vis., cSt @ 15° C.: 70.7

Neut. No.: 0.71
Nitrogen, wt %: 0.29
Pour pt, °C.: −60
C_5 & lighter yield, vol %: 7.43

Naphtha
Range, °C.: 20-175
Yield, vol %: 30.0
RON clear: 63.7
Sulfur, wt %: 0.06

Distillate
Range, °C.: 175-295
Yield, vol %: 10.5
Density, kg/cu cm: 0.7983
Sulfur, wt %: 0.76
Aniline pt, °C.: 56
Vis., cSt @ 40 °C.: 2.0
Freezing pt, °C.: −61.5
Pour pt, °C.: −51
Smoke pt, °C.: 18.4

Gas oil
Range, °C.: 343-517
Yield, vol %: 18.7
Density, kg/cu cm @ 15 °C.: 0.9536
Sulfur, wt %: 2.96
Nitrogen, wt %: 0.08
Ni/V, wt ppm: 0.05/0.15

Residium
Range, °C.: 343 +
Yield, vol %: 51.6
Density, kg/cu cm: 1.0203
Sulfur, wt %: 4.8
Vis., cSt @ 60 °C.: 7,750
Pour pt, °C.: +51
Ni/V/Fe, wt ppm: 90.6/213.7/12.8

Asphalt
Range, °C.: 405 +
Yield, vol %: 47.8
Density @ 15 °C., kg/cu m: 1,030.7
Pen. @ 25 °C. (100/5): 343
Pen. @ 4 °C. (100/5): 36
Pen. index: −1.01
Vis. @ 60 °C., Poises: 298
Vis. @ 100 °C., cSt: 994

Asphalt
Range, °C.: 470 +
Yield, vol %: 37.7
Density @ 15 °C., kg/cu m: 1,046.9
Pen. @ 25 °C. (100/5): 60
Pen. @ 4 °C. (100/5): 6
Pen. index: −0.46
Vis. @ 60 °C., Poises: 3,576
Vis. @ 100 °C., cSt: 4,894

*Diluent added to crude to permit pipeline transportation. This assay made on blend of 28 wt % mixed condensate (gravity, °API, 58.9) and 72 wt % Cold Lake Crude that had the following characteristics:

Gravity, °API: 13.2
Density @ 15 °C.: 0.9770
Sulfur, wt %: 4.11
Nitrogen, wt %: 0.42
Pour pt, °C.: −4
Vis., cSt @ 40 °C.: 1,057
Vis., cSt @ 80 °C.: 98

†Has access to Interprovincial and Trans Mountain pipelines at Edmonton.

Federated Light and Medium, Alberta

Federated Pipe Line Ltd. to Edmonton*

Crude
Gravity, °API: 39.7
Sulfur, g/kg: 2.01
Total nitrogen, wt %: 0.11
Rvp, kPa: 31.0
Pour pt, °C.: −10.0
Con. carbon, wt %: 1.46
Vis. cSt @ 40 °C.: 3.30
Wax, wt %: 9.12
Neut. value, mg: 0.00
Ni/V, ppm: 0.07/0.00
C_4 & lighter, vol %: 3.43

Naphtha
Range, °C.: C_5-190
Yield, vol %: 30.90
Sulfur, g/kg: 0.05
Paraffins, vol %: 28.30
Naphthenes, vol %: 54.90
Aromatics, vol %: 16.80
RON clear: 56.4

Kerosine
Range, °C.: 190-277
Yield, vol %: 18.25
Gravity, °API: 41.0
Sulfur, g/kg: 0.68
Aromatics, vol %: 23.00
Aniline pt, °C.: 142.0
Pour pt, °C.: −40.0
Freezing pt, °C.: −39.0
Cetane no.: 47.0

Distillate
Range, °C.: 277-343
Yield, vol %: 13.73
Gravity, °API: 34.6
Sulfur, g/kg: 1.97
Aniline pt, °C.: 80.7
Pour pt, °C.: −7.5
Cetane no.: 55.0
Cetane index: 49.0
Vis., cSt @ 38 °C.: 4.43

Gas oil
Range, °C.: 343-565
Yield, vol %: 28.29
Gravity, °API: 25.6
Sulfur, g/kg: 3.10
Total nitrogen, wt %: 0.16
Pour pt, °C.: 40.0
Con. carbon, wt %: 0.45
Vis., cSt @ 50 °C.: 29.32
Ni/V, wt ppm: 1.24/0.00

Residue
Range, °C.: 565 +
Yield, vol %: 8.83
Gravity, °API: 15.2
Sulfur, g/kg: 5.40
Pour pt, °C.: 26.0
Vis., cSt @ 135 °C.: 30.64
Ni/V, wt ppm: 9.50/5.70

*Has access to Interprovincial and Trans Mountain pipelines at Edmonton.

Gulf Alberta, L & M

Gulf Alberta Pipeline to Edmonton*

Crude
Gravity, °API: 35.1
Sulfur, g/kg: 9.80
H_2S, wt ppm: 58.1
Rvp, kPa: 36.4
Pour pt, °C.: −27.5
Vis., cSt @ 40 °C.: 4.86
Ni/V, wt ppm: 10.10/9.00
C_4 & lighter, yield, vol %: 3.50

Naphtha
Range, °C.: C_5-190
Yield, vol %: 30.60
Sulfur, g/kg: 0.36
Paraffins, vol %: 56.04
Olefins, vol %: 0.00
Naphthenes, vol %: 31.53
Aromatics, vol %: 12.43

Kerosine
Range, °C.: 190-277
Yield, vol %: 14.20
Gravity, °API: 39.9
Sulfur, g/kg: 2.76
Aromatics, vol %: 28.13
Aniline pt, °C.: 59.7
Pour pt, °C.: −40.0
Cetane no.: 46.0
Cetane index: 49.0
Smoke pt, mm: 19.0

Distillate
Range, °C.: 277-343
Yield, vol %: 8.53
Gravity, °API: 22.1
Sulfur, g/kg: 7.67
Aniline pt, °C.: 70.0
Pour pt, °C.: −10.0
Cetane no.: 52.0
Cetane index: 55.0
Vis., cSt @ 38 °C.: 5.14

Gas oil
Range, °C.: 343-565
Yield, vol %: 31.43
Gravity, °API: 23.8
Sulfur, g/kg: 12.72
Total nitrogen, wt %: 0.13
Pour pt, °C.: 31.0
Con. carbon, wt %: 0.23
Vis., cSt @ 38 °C.: 44.22
Ni/V, ppm: 0.40/0.00

Residue
Range, °C.: 565 +
Yield, vol %: 15.2
Gravity, °API: 14.6
Sulfur, g/kg: 23.87
Pour pt, °C.: 44.0
Vis., cSt @ 135 °C.: 59.97
Ni/V, wt ppm: 24.10/25.10

*Access to Interprovincial and Trans Mountain pipelines at Edmonton.

Lloydminster,* Alberta and Saskatchewan

Husky Oil Operations Ltd. pipeline to Hardisty, Alta.†

Crude
Gravity, °API: 20.7
Sulfur, g/kg: 31.5
Rvp, kPa: 30.3
Pour pt, °C.: −32.0
Con. carbon, wt %: 9.18
Vis., cSt @ 40 °C.: 101.00
Neut. value, mg: 0.78
Ni/V, wt ppm: 52.70/10.50
C_4 & lighter, yield, vol %: 0.48

Naphtha
Range: C_5-190
Yield, vol %: 19.50
Sulfur, g/kg: 0.79
Paraffins, vol %: 55.10
Olefins, vol %: 1.50
Naphthenes, vol %: 31.60
Aromatics, vol %: 11.80

Kerosine
Range, °C.: 190-277
Yield, vol %: 9.80
Gravity, °API: 34.9
Sulfur, g/kg: 5.05
Aromatics, vol %: 22.40
Aniline pt, °C.: 52.4
Pour pt, °C.: −63.3
Cetane no.: 35.0
Smoke pt, mm: 19.0

Distillate
Range, °C.: 277-343
Yield, vol %: 9.50

Gravity, °API: 26.5
Sulfur, g/kg: 8.45
Aromatics, vol %: 38.90
Aniline pt, °C.: 56.5
Pour pt, °C.: − 31.1
Cetane no.: 40.0
Cetane index: 41.5
Vis., cSt @ 38° C.: 6.32

Gas oil
Range, °C.: 343-565
Yield, vol %: 25.20
Gravity, °API: 17.5
Sulfur, g/kg: 28.50
Aniline pt, °C.: 72.2
Pour pt, °C.: 1.7
Con. carbon, wt %: 0.55
Vis., cSt @ 38° C.: 155.00
Ni/V, wt ppm: 0.00/0.10

Residue
Range, °C.: 565 +
Yield, vol %: 36.00
Gravity, °API: 2.9
Sulfur, g/kg: 56.90
Pour pt, °C.: 69.0
Con. carbon, wt %: 25.10
Vis., cSt @ 135° C.: 3,260
Ni/V, wt ppm: 123/231

*Crude has been blended with pipeline condensate to permit transportation. Typically 20-25% condensate is added to crude.
†Has access to Interprovincial pipeline at Hardisty.

Rainbow Light and Medium, Alberta

*Rainbow Pipe Line Co. Ltd. to Edmonton**

Crude
Gravity, °API: 40.7
Sulfur, g/kg: 5.00
H_2S, wt ppm: 10.2
Rvp, kPa: 33.9
Pour pt, °C.: 2.5
Con. carbon, wt %: 1.65
Vis., cSt @ 40° C.: 3.77
Wax, wt %: 20.40
Neut. value, mg: 0.08
Ni/V, wt ppm: 0.85/0.50
C_4 & lighter, yield, vol %: 3.40

Naphtha
Range, °C.: C_5-190
Yield, vol %: 38.70
Sulfur, g/kg: 0.14
Paraffins, vol %: 61.25
Naphthenes, vol %: 25.96
Aromatics, vol %: 12.79
RON clear: 51.2
MON clear: 51.4

Kerosine
Range, °C.: 190-277
Yield, vol %: 13.00
Gravity, °API: 42.2
Sulfur, g/kg: 1.20
Aromatics, vol %: 24.23
Aniline pt, °C.: 62.3
Pour pt, °C.: − 37.5
Freezing pt, °C.: − 35.0
Cetane no.: 46.0
Cetane index: 47.8
Smoke pt, mm: 20.0
Vis., cSt @ 40° C.: 1.55

Distillate
Range, °C.: 277-343
Yield, vol %: 11.50
Gravity, °API: 35.0
Sulfur, g/kg: 4.40
Aniline pt, °C.: 75.5
Pour pt, °C.: − 5.0
Cetane no.: 59.0
Cetane index: 55.0
Vis., cSt @ 38° C.: 4.51

Gas oil
Range, °C.: 343-565
Yield, vol %: 31.65
Sulfur, g/kg: 8.04
Total nitrogen, wt %: 0.69
Pour pt, °C.: 26.0
Con. carbon, wt %: 0.16
Vis., cSt @ 50° C.: 20.39
Asphaltenes, vol %: 4.10
Ni/V, wt ppm: 0.02/0.00

Residue
Range, °C.: 565 +
Yield, vol %: 5.15
Gravity, °API: 19.6
Sulfur, g/kg: 10.71
Total nitrogen, wt %: 3.22
Pour pt, °C.: 28.0
Con. carbon, wt %: 11.11
Vis., cSt @ 135° C.: 27.82
Asphaltenes, wt %: 13.42
Ni/V, wt ppm: 4.60/2.90

*Has access to Interprovincial and Trans Mountain pipelines at Edmonton.

Rangeland-South L & M, Alberta

Rangeland Pipe Line Co. to Canadian/U.S. border near Carway, Alta.

Crude
Gravity, °API: 39.5
Sulfur, g/kg: 7.52
H_2S, wt ppm: 20.1
Rvp, kPa: 39.3
Pour pt, °C.: − 40.0
Con. carbon, wt %: 0.69
Vis., cSt @ 40° C.: 2.67
Wax, wt %: 12.44
Neut. value, mg: 0.12
Ni/V, wt ppm: 1.20/1.40
C_4 & lighter, yield, wt %: 3.22

Naphtha
Range, °C.: C_5-190
Yield, vol %: 38.75
Sulfur, g/kg: 0.12
Rvp, kPa: 41.1
Paraffins, vol %: 42.45
Naphthenes, vol %: 36.86
Aromatics, vol %: 20.69
RON clear: 58.5
MON clear: 57.3

Kerosine
Range, °C.: 190-277
Yield, vol %: 15.50
Gravity, °API: 38.3
Sulfur, g/kg: 1.87
Aromatics, vol %: 24.0
Aniline pt, °C.: 62.0
Pour pt, °C.: − 37.5
Freezing pt, °C.: − 28.5
Cetane no.: 48.0
Smoke pt, mm: 20.0

Distillate
Range, °C.: 277-343
Yield, vol %: 8.55
Gravity, °API: 32.0
Sulfur, g/kg: 4.79
Aniline pt, °C.: 71.0
Pour pt, °C.: − 7.5
Cetane no.: 51.0
Cetane index: 52.0
Vis., cSt @ 38° C.: 5.24

Gas oil
Range, °C.: 343-565
Yield, vol %: 33.20
Gravity, °API: 26.5
Sulfur, g/kg: 11.64
Total nitrogen, wt %: 0.62
Aniline pt, °C.: 86.6
Pour pt, °C.: 24.0
Con. carbon, wt %: 0.10
Vis., cSt @ 38° C.: 42.02

Residue
Range, °C.: 565 +
Yield, vol %: 4.0
Gravity, °API: 21.7
Sulfur, g/kg: 12.19
Pour pt, °C.: 27.5
Vis., cSt @ 135° C.: 18.75
Asphaltenes, wt %: 10.13
Ni/V, wt ppm: 3.0/7.4

Wainwright—Kinsella,* Alberta

Husky Oil Operations Ltd. pipeline to Hardisty, Alta.†

Crude
Gravity, °API: 23.1
Sulfur, g/kg: 15.80
Rvp, kPa: 30.3
Pour pt, °C.: − 39.0
Con. carbon, wt %: 6.70
Vis., cSt @ 40° C.: 32.50
Ni/V, ppm: 40.30/79.90

Naphtha
Range, °C.: C_5-190
Yield, vol %: 19.0
Sulfur, g/kg: 0.50
Paraffins, vol %: 52.50
Naphthenes, vol %: 37.80
Aromatics, vol %: 8.90

Kerosine
Range, °C.: 190-277
Yield, vol %: 12.00
Gravity, °API: 36.3
Sulfur, g/kg: 3.44
Aromatics, vol %: 22.80
Aniline pt, °C.: 56.7
Freezing pt, °C.: − 51.6
Cetane no.: 37.0
Smoke pt, mm: 26.0

Distillate
Range, °C.: 277-343
Yield, vol %: 11.0
Gravity, °API: 28.1
Sulfur, g/kg: 10.50
Aromatics, vol %: 33.70
Aniline pt, °C.: 60.5
Pour pt, °C.: − 22.0
Cetane no.: 42.0
Cetane index: 43.9
Vis., cSt @ 38° C.: 5.69

Gas oil
Range, °C.: 343-565
Yield, vol %: 26.00
Gravity, °API: 19.1
Sulfur, g/kg: 21.80
Total nitrogen, wt %: 0.03
Pour pt, °C.: 12.8
Vis., cSt @ 38° C.: 131.0
Con. carbon, wt %: 0.55
Ni/V, wt ppm: 0.11/0.00

Residue
Range, °C.: 565 +
Yield, vol %: 32.0
Gravity, °API: 3.7
Sulfur, g/kg: 52.60
Pour pt, °C.: 74.0
Vis., cSt @ 135° C.: 212.00
Asphaltenes, wt %: 19.10
Ni/V, ppm: 110/222

*Note: crude blended with condensate to permit transportation.
†Has access to Interprovincial Pipeline.

U.S.

Alaska North Slope (ANS, Sadlerochit)

Trans Alaska Pipeline to Valdez Terminal

Crude
Gravity, °API: 26.4
Sulfur, wt %: 1.06
Pour pt., °F.: 0
Rvp, psi: 3.55
Kin. vis. @ 60° F.: 42.42
H_2S, lb/1,000 bbl: 0.35
Salt, lb/1,000 bbl: 32.7
Carbon residue, wt %: 4.40
Neut. no. (D974): 1.12
Ni/V, ppm: 11/26
Nitrogen, ppm: 2,090
C_4 & lighter, yield, vol %: 1.17

Light gasoline
Range, °F.: C_5—150
Yield, vol %: 2.2
Sulfur, wt %: <0.001
RON clear: 71.5
MON clear: 69.8
RON + 0.5g TEL/gal: 78.4

Naphtha
Range, °F.: 150—380
Yield, vol %: 15.6
Sulfur, wt %: 0.013
Paraffins, vol %: 39.7
Naphthenes, vol %: 43.3
Aromatics, vol %: 17.0

Distillate
Range, °F.: 380—650
Yield, vol %: 28.6
Gravity, °API: 33.1
Sulfur, wt %: 0.414
Pour pt., °F.: -25
Cetane No.: 45.8
Total N_2, ppm: 79
Aromatics, vol %: 33.6

Blended gas oil
Range, °F.: 650—840
Yield, vol %: 16.4
Gravity, °API: 23.8
Sulfur, wt %: 1.10
Aniline pt., °C.: 74.7
Pour pt., °F.: 70
Carbon residue, %: 0.012
Total nitrogen, ppm: 950
Basic nitrogen: 0.03

Residue
Range, °F.: 650 -
Yield, vol %: 52.4
Gravity, °API: 15.0
Sulfur, wt %: 1.63
Carbon residue, %: 8.82
Total nitrogen, ppm: 3,600
Pour pt., °F.: 80
Kin. vis. @ 210° F.: 47.54
Kin. vis. @ 275° F.: 15.55

Note: This assay is of Sadlerochit crude, originally the only component of North Slope crude. Kuparuk crude is now blended at a rate of about 120,000 b/d with Sadlerochit at pumpstation No. 1. Total ANS stream is about 1.6 million b/d. See Kuparuk analysis in this section.

Kuparuk,* Alaska

Trans Alaska Pipeline to Valdez Terminal

Crude
Gravity, °API: 23.0
Sulfur, wt %: 1.76
Pour pt., °F.: -55
Rvp, psi: 2.6
Kin. vis. @ 60° F., cSt: 79.98
H_2S, lb/1,000 bbl: <5
Carbon residue, wt %: 7.37
Ni/V, ppm: 19/57
Nitrogen, ppm: 1,980
C_4 & lighter, vol %: 2.12

Light gasoline
Range (TBP), °F.: C_5—150
Yield, vol %: 1.6
Sulfur, wt %: 0.006

Naphtha
Range, °F.: 150—380
Yield, vol %: 14.5
Sulfur, wt %: 0.018
Paraffins, vol %: 38.3
Naphthenes, vol %: 47.0
Aromatics, vol %: 14.7

Distillate
Range, °F.: 380—650
Yield, vol %: 26.9
Sulfur, wt %: 0.66
Pour pt., °F.: -25
Cetane No.: 45.4
Vis., cSt @ 100° F.: 3.083
Aromatics, wt %: 30.0

Gas oil
Range, °F.: 650—840
Yield, vol %: 18.9
Gravity, °API: 20.5
Sulfur, wt %: 1.79
Aniline pt., °C.: 104.3
Pour pt., °F.: 50
Kin. vis. @ 100° F.: 34.20
Carbon residue, wt %: 0.01
Total nitrogen, ppm: 600
Basic nitrogen, wt %: 0.02
V/Ni, ppm: <1

Residue
Range, °F.: 650 -
Yield, vol %: 56.0
Gravity, °API: 11.7
Sulfur, wt %: 2.59
Carbon residue, wt %: 12.61
Pour pt., °F.: 40
Kin. vis. @ 210° F.: 97.15

*About 120,000 b/d of Kuparuk is blended with some 1.6 million b/d of Sadlerochit crude to produce North Slope crude. Kuparuk contribution is expected to double by early 1985.

West Sak,* Alaska

Not in production

Crude
Gravity, °API: 22.4
Sulfur, wt %: 1.82
Pour pt., °F.: -50
Rvp, psi: 2.70
Kin. vis. @ 60° F.: 95.92
Carbon residue, wt %: 7.62
Ni/V, ppm: 22/61
Neut. no. (D974): 0.68
C_4 & lighter, yield, vol %: 0.63

Light gasoline
Range, °F.: C_5—150
Yield, vol %: 1.9
Sulfur, wt %: 0.004

Naphtha
Range, °F.: 150—380
Yield, vol %: 14.4
Sulfur, wt %: 0.018
Paraffins, vol %: 36.4
Naphthenes, vol %: 48.2
Aromatics, vol %: 15.4

Distillate
Range, °F.: 380—650
Yield, vol %: 27.5
Gravity, °API: 31.6
Sulfur, wt %: 0.700
Pour pt., °F.: -35
Cetane no.: 42.1
Aromatics, vol %: 31.4
Vis., cSt @ 100° F.: 3.34

Gas oil
Range, °F.: 650—840
Yield, vol %: 16.6
Gravity, °API: 21.1
Sulfur, wt %: 1.81
Pour pt., °F.: 60
Kin. vis. @ 100° F.: 43.99
Total nitrogen, ppm: 840
Basic nitrogen: 0.023

Residue
Range, °F.: 650 -
Yield, vol %: 55.6
Gravity, °API: 10.8
Sulfur, wt %: 2.53
Carbon residue, wt %: 13.15
Pour pt., °F.: 45
Kin. vis. @ 210° F.: 135.3
Pentane insoluble, wt %: 14.97

*Crude not in production, but pilot program is underway in Kuparuk area to determine feasibility. Assay sample obtained during drill stem test.

Crude oil streams by country of origin*

Abu Dhabi, U.A.E.
Abu Al Bu Khoosh—Cie. Francaise des Petroles
Murban—Abu Dhabi National Oil Co.
Umm Shaif (Abu Dhabi Marine)—Adnoc
Zakum (Lower Zakum)—Adnoc

Algeria
Saharan Blend—Sonatrach
Zarzaitine—Sonatrach

Angola
Cabinda—Cabinda Gulf Oil Co.
Soyo Blend—Cia. de Petroles de Angola and Texaco Angola

Brunei
Champion Export—Brunei Shell
Seria Light—Brunei Shell

Cameroon
Kole Marine Blend—Elf Serepca

Canada
Bow River Heavy—Alberta Petroleum Marketing Commission
Cold Lake—Esso Petroleum Canada/APMC
Federated—APMC/Home Oil Ltd.
Gulf Alberta L & M—APMC/Gulf Canada
Lloydminster—Husky Oil Operations Ltd.
Rainbow Light & Medium—APMC/Mobil Oil Canada
Rangeland South—APMC/Dome Petroleum Ltd.
Wainwright-Kinsella—APMC/Husky Oil Operations Ltd.

China
Shengli—Petroleum Corp. of PRC
Taching (Daqing)—Petroleum Corp. of PRC

Congo (Brazzaville)
Djeno Blend (Djeno Melange)—Elf Congo

Denmark
Dan—Dansk Undergrunds Consortium (DUC)
Gorm—DUC

Divided Zone
Burgan (Wafra)—Getty and Kuwait Oil Co.
Eocene (Wafra)—Getty and Kuwait Oil Co.
Hout—Arabian Oil Co.
Khafji—AOC

Dubai, U.A.E.
Dubai (Fateh)—Dubai Petroleum Co.

Ecuador
Oriente—Texaco

Egypt
Belayim—AGIP
Gulf of Suez Mix—Amoco

Gabon
Gamba—Elf Gabon
Lucina Marine—Elf Gabon
Mandji—Elf Gabon

Ghana
Salt Pond—Agri-Petco

India
Bombay High—Oil & Natural Gas Commission

Indonesia
Ardjuna—Atlantic Richfield Indonesia Inc.
Arimbi—ARCO Indonesia
Attaka—Union Oil Co. of Indonesia
Badak—Roy M. Huffington Inc.
Bekapai—Total Indonesie
Bunyu—Pertamina
Cinta—Independent Indonesian American Petroleum Co.
Duri (Sumatran Heavy)—Caltex Pacific Indonesia
Handil—Total Indonesie
Jatibarang—Pertamina
Minas (Sumatran Light)—Caltex Pacific Indonesia
Salawati—Philips Petroleum Co. Indonesia
Sanga Sanga—Tesoro
Sepinggan—Yakin Mixed (4:1)—Union Oil Co. of Indonesia
Udang—Conoco of Indonesia
Walio—Petromer Trend Corp.

Iran
Abouzar (Ardeshir)—National Iranian Oil Co.
Bahrgansar/Nowruz (Sirip Blend)—NIOC
Dorrood (Darius)—NIOC
Foroozan (Fereidoon)—NIOC
Iranian Heavy—NIOC
Iranian Light—NIOC
Rostam—NIOC
Salmon (Sassan)—NIOC
Sirri—NIOC
Soroosh (Cyrus) Iran—NIOC

Iraq
Basrah Heavy—Iraq National Oil Co.
Basrah Light—INOC
Basrah Medium—INOC
Kirkuk Blend—INOC

Ivory Coast
Espoir—Phillips Petroleum Co. Ivory Coast

Kuwait
Kuwait—Kuwait Oil Co.

Libya
Amna (high pour)—Libyan National Oil Corp.
Brega—LNOC
Bu Attifel—AGIP
Es Sider—Oasis
Sarir—LNOC
Sirtica—LNOC
Zueitina—Occidental

Malaysia
Bekok—Esso Malaysia
Bintulu—Shell Malaysia
Labuan Blend—Shell Malaysia
Miri Light—Shell Malaysia
Pulai—Esso Malaysia
Tapis—Esso Malaysia
Tapis Blend—Esso Malaysia
Tembungo—Esso Malaysia

Mexico
Isthmus—Pemex
Maya—Pemex

Nigeria
Bonny Light—Shell
Bonny Medium—Shell
Brass River—Phillips Oil Co. (Nigeria)
Escravos—Gulf Oil Co. (Nigeria)
Forcados Blend—Shell
Pennington—Texaco Overseas (Nigeria)
Qua Iboe (Nigerian Light)—Mobil Oil Nigeria

Norway
Ekofisk—Phillips Petroleum
Gullfaks—Statoil
Murchison—Conoco
Statfjord—Mobil

Oman
Oman Export—Petroleum Development (Oman) Ltd. and Elf Group

Qatar
Dukhan (Qatar land)—Qatar General Petroleum Corp.
Qatar Marine—QGPC

Saudi Arabia
Arabian Heavy (Safaniya)—Arabian American Oil Co.
Arabian Light—Aramco
Arabian Light (Berri)—Aramco
Arabian Medium (Khursaniyah)—Aramco
Arabian Medium (Zuluf/Marjan)—Aramco

Sharjah, U.A.E.
Mubarek—Buttes Resources Co.

Syria
Souedie—Syrian Petroleum Co.

Trinidad
Galeota Mix (Trinidad Blend)—Amoco

Tunisia
Ashtart—Elf Aquitaine
El Borma—AGIP

United Kingdom
Argyll—Hamilton Bros.
Auk—Shell/Esso
Beatrice—Britoil
Beryl—Mobil
Brae—Marathon
Brent—Shell/Esso
Brent Blend
Buchan—BP
Cormorant, North—Shell/Esso
Cormorant, South (Cormorant "A")—Shell/Esso
Dunlin—Shell/Esso
Flotta—Occidental/Texaco
Forties—BP
Fulmar—Shell/Esso
Magnus—BP
Maureen—Phillips Petroleum
Montrose—Amoco
Murchison—Conoco
Ninian Blend—Chevron/Union/BP
Statfjord—Conoco
Tartan—Texaco
Thistle—Britoil

U.S.
Alaska North Slope (ANS, Sadlerochit)—Sohio/Exxon/ARCO
Kuparuk—ARCO
West Sak—ARCO

U.S.S.R.
Soviet Export Blend—V/O Soyuznefteexport

Venezuela
BCF 24—Affiliate of Petroleos de Venezuela
Bachaquero—Affiliate of Petroleos de Venezuela
Boscan—Affiliate of Petroleos de Venezuela
Ceuta—Affiliate of Petroleos de Venezuela
Lagomedio—Affiliate of Petroleos de Venezuela
La Rosa—Affiliate of Petroleos de Venezuela
Leona—Affiliate of Petroleos de Venezuela
Merey—Affiliate of Petroleos de Venezuela
Tia Juana Light—Affiliate of Petroleos de Venezuela
Tia Juana Pesado—Affiliate of Petroleos de Venezuela

Zaire
Zaire—Zaire Gulf Oil Co.

*Names in parentheses are former or secondary names of crudes. Companies listed are primary operators or sales contacts.

AILLEEN CANTRELL
Director of Editorial Surveys

1985 Worldwide Petrochemical Survey

ABU DHABI

RUWAIS FERTILIZER INDUSTRIES

Ruwais. Feed: associated gas. Products: ammonia (1,000 mt/d), urea (1,500 mt/d).

ALGERIA

SONATRACH

Arzew. Feed: natural gas. Products: ammonia (1,000 mt/d), aromatics mix (1,152 mt/d), benzene (273 mt/d), ethylene (364 mt/d), formaldehyde (61 mt/d), methanol (303 mt/d), orthoxylene (115 mt/d), ld polyethylene (145 mt/d), polyvinyl chloride (106 mt/d), toluene (5,000 mt/d), urea (400 mt/d), xylene mix (748 mt/d).

ARGENTINA

ATANOR

Baradero, Buenos Aires. Feed: ethyl alcohol. Products: acetaldehyde (5,345 mt/y), acetic acid (7,060 mt/y), acetic anhydride (2,140 mt/y).

Munro, Buenos Aires. Feed: ethyl alcohol, methanol. Products: acetaldehyde (2,405 mt/y), acetic acid (3,210 mt/y), formaldehyde (25,680 mt/y).

Rio Tercero, Córdoba. Feed: ethyl alcohol, natural gas. Products: acetaldehyde (3,250 mt/y), acetic acid (4,280 mt/y), methanol (12,880 mt/y).

CARBOCLOR INDUSTRIAS QUIMICAS

Campana. Feed: C_3 and C_4 refinery cuts. Products: acetone (12,000 mt/y), isopropanol (33,000 mt/y).

CASCO SAIC

Pilar. Feed: methanol, natural gas. Products: formaldehyde (38,000 mt/y), methanol (20,000 mt/y).

DIRECCION GENERAL DE FABRICACIONES MILITARES

Campana. Feed: hydrocarbon fractions. Product: aromatics (27,000 mt/y).

Rio Tercero, Cordoba. Feed: natural gas. Product: ammonia (12,000 mt/y).

DUPERIAL SAIC

(subsidiary of Imperial Chemical Industries)

San Lorenzo. Feed: sulfur, natural gas, naphtha, orthoxylene, ethylene, phthalic anhydride, alcohols. Products: carbon disulfide (14,000 mt/y), ethylene (15,000 mt/y), phthalic anhydride (12,400 mt/y), ld polyethylene (20,000 mt/y), plasticizers (18,000 mt/y), propylene-butadiene (6,000 mt/y).

ELECTROCLOR SAIC

Capitán Bermudez, Santa Fe. Feed: calcium carbide, chlorine, hydrogen. Products: acetylene (30,000 mt/d), ammonia (3,000 mt/y), polyvinyl chloride (29,000 mt/y), vinyl chloride (30,500 mt/y).

IPAKO-Industrias Petroquimicas Argentinas

(owned by private Argentine interests)

Ensenada. Feed: refinery gases. Products: ethylene (15,000 mt/y), ld polyethylene (14,000 mt/y).

MALEIC SA

Ensenada, Buenos Aires. Feed: n-butane. Product: maleic anhydride (7,200 mt/y).

MONSANTO ARGENTINA SAIC

Florencio Varela. Feed: styrene. Product: polystyrene (6,000 mt/y).

Zarate. Feed: styrene. Products: ABS (7,000 mt/y), polystyrene (19,000 mt/y).

PASA PETROQUIMICA ARGENTINA

(owned by Amcorp SA, Fish Inter-America Inc., Uniroyal Inc., Vista Chemical Co. and Witco Chemical Corp.)

Pto. Gral. San Martin, Santa Fe. Feed: butane, naphtha, propane. Products: aromatics (150,000 mt/y), butadiene (33,000 mt/y), ethylbenzene (65,000 mt/y), ethylene (23,000 mt/y), styrene (54,000 mt/y), SBR (50,000 mt/y).

PETROQUIMICA BAHIA BLANCA SAIC

Bahia Blanca. Feed: ethane, propane. Products: C_4's (14,400 mt/y), ethylene (200,000 mt/y), propylene (20,000 mt/y).

PETROQUIMICA GENERAL MOSCONI

Ensenada, Buenos Aires. Feed: naphtha. Products: benzene (84,000 mt/y), cyclohexane (42,000 mt/y), orthoxylene (23,000 mt/y), paraxylene (35,000 mt/y), toluene (33,000 mt/y), xylene mix (9,000 mt/y).

PETROSUR SAIC

Campana. Feed: natural gas. Products: ammonia (210 mt/d), urea (300 mt/d).

POLISUR

Bahia Blanca. Feed: ethylene. Product: ld polyethylene (190,000 mt/y).

SUDAMTEX SA

Azul, Buenos Aires. Feed: dimethyl terephthalate, ethylene glycol. Products: methanol (1,650 mt/y), polyester (5,000 mt/y).

AUSTRALIA

ALTONA PETROCHEMICAL CL

(50% Esso Australia Ltd., 50% Mobil Oil Australia)

Altona, Vic. Feed: gas oil, ethane. Products: butadiene (17,000 mt/y), carbon black oil (70,000 mt/y), ethylene (170,000 mt/y), propylene (50,000 mt/y).

AMPOL REFINERIES LTD.

Lytton, Brisbane. Feed: kerosine, naphtha, reformate. Product: solvents (9,000 mt/y).

AUSTRALIAN CARBON BLACK PL

(100% Cabot Corp.)

Altona, Vic. Feed: petroleum residual. Product: carbon black (58,000 mt/y).

AUSTRALIAN SYNTHETIC RUBBER CL

(35% Esso Australia Ltd., 35% Mobil Oil Australia Ltd., 30% Goodyear Tyre & Rubber Co. (Australia) Ltd.)

Altona. Feed: butadiene, styrene. Products: polybutadiene (10,000 mt/y), SBR (35,000 mt/y).

BORDEN AUSTRALIA PL

Brisbane, Gibson Island. Feed: methanol. Products: formaldehyde (23,000 mt/y), resins.

Granville. Feed: methanol. Products: formaldehyde (8,300 mt/y), resins.

Melbourne. Feed: methanol. Products: formaldehyde (23,000 mt/y), resins.

COMPOL LTD.

(50% Mobil, 50% Exxon)

Altona, Vic. Feed: ethylene. Products: ld polyethylene (55,000 mt/y), hd polyethylene (55,000 mt/y).

CONTINENTAL CARBON AUSTRALIA PL

(subsidiary of Witco Chemical Corp.)

Kurnell, NSW. Feed: heavy aromatic oil. Product: carbon black (22,500 mt/y).

CSR CHEMICALS LTD.

Rhodes, Lane Cove, Mayfield. Feed: ethylene, natural gas, heptene, naphthalene, propylene. Products: acetaldehyde (15,000 mt/y), acetic acid (18,500 mt/y), acetic anhydride (3,000 mt/y), butanols (9,500 mt/y), iso-octanol (14,000 mt/y), phthalic anhydride (21,500 mt/y), vinyl acetate (13,000 mt/y), solvents (9,500 mt/y), plasticizers (32,500 mt/y).

HOECHST AUSTRALIA LTD.

(owned 95% by Farbwerke Hoechst AG)

Altona. Feed: olefins. Products: hd polyethylene (56,000 mt/y), polypropylene (35,000 mt/y).

ICI AUSTRALIA LTD.

Botany, NSW. Feed: LPG, light naphtha. Products: butadiene (23,000 mt/y), butylenes (23,000 mt/y), ethylene (250,000 mt/y), ethylene oxide (30,000 mt/y), ld polyethylene (90,000 mt/y), polypropylene (55,000 mt/y), propylene (95,000 mt/y), polyvinyl chloride (56,000 mt/y), vinyl chloride (60,000 mt/y).

Laverton, Vic. Feed: vinyl chloride. Product: polyvinyl chloride (50,000 mt/y).

INCITEC LTD.

Gibson Island. Feed: natural gas. Products: ammonia (200,000 mt/y), urea (225,000 mt/y).

Newcastle, NSW. Feed: natural gas. Product: ammonia (185,000 mt/y).

KWINANA NITROGEN CPL

Kwinana. Feed: refinery offgases. Product: ammonia (305 mt/d).

MONSANTO AUSTRALIA LTD.

West Footscray. Feed: benzene, ethane, propylene. Products: acetic acid, acetone, phenol, polyester, polystyrene, styrene, ABS, SBR.

SHELL CHEMICAL (AUSTRALIA) PL

Clyde, N.S.W. Feed: refinery gases. Products: propylene, polypropylene (32,000 mt/y).

Geelong, Victoria. Feed: naphtha, gasoline, refinery gases. Products: alkylbenzene, hydrocarbon solvents and aromatics (50,000 mt/y), polypropylene (60,000 mt/y), propylene.

AUSTRIA

CHEMIE LINZ AG

Linz. Feed: natural gas, naphtha, propylene, benzene, orthoxylene. Products: acrylonitrile (75,000 mt/y), ammonia (560,000 mt/y), maleic anhydride (10,000 mt/y), melamine (35,000 mt/y), oxoalcohols (60,000 mt/y), phthalic anhydride (60,000 mt/y), urea (300,000 mt/y), plasticizers (50,000 mt/y).

HALVIC KUNSTOFFWERKE GmbH

Hallein. Feed: vinyl chloride monomer. Product: polyvinyl chloride.

OMV AG

Schwechat. Feed: butane, gasoil, naphtha. Products: butadiene (50,000 mt/y), ethylene (285,000 mt/y), propylene (150,000 mt/y).

PETROCHEMIE DANUBIA GmbH
(100% OMV AG)

Schwechat. Feed: ethylene, propylene. Product: oxoalcohols (60,000 mt/y), phthalic anhydride (25,000 mt/y), polyethylene (230,000 mt/y), polypropylene (110,000 mt/y).

VIANOVA KUNSTHARZ AG

Werndorf. Feed: alcohols, acids, oils. Products: acrylics and alkyds, unsaturated polyesters, water soluble resins (45,000 mt/y).

BANGLADESH

ZIA FERTILIZER CL
(Bangladesh Chemical Industries Corp.)

Ashuganj. Product: urea (928,000 mt/y).

BELGIUM

AMOCO CHEMICALS BELGIUM NV
(wholly owned by Standard Oil Co. of Indiana).

Geel. Feed: metaxylene, methanol, paraxylene, propylene. Products: dimethyl terephthalate (66,000 mt/y), isophthalic acid (36,000 mt/y), polypropylene (145,000 mt/y), terephthalic acid (95,000 mt/y).

ASED-MARLY NV

Brussels. Feed: natural gas. Product: ammonia (146,000 mt/y).

ASED NV

Willebroek. Feed: natural gas. Product: ammonia (132,000 mt/y).

BASF ANTWERPEN NV

Antwerp. Feed: ethylene, benzene, cyclohexane, vinyl chloride. Products: caprolactam (150,000 mt/y), ethylene glycol (160,000 mt/y), ethylene oxide (150,000 mt/y), polystyrene (145,000 mt/y), polyvinyl chloride (150,000 mt/y), vinyl chloride (160,000 mt/y).

BAYER ANTWERPEN NV

Antwerp. Feed: cyclohexane. Products: caprolactam (110,000 mt/y), polyamid 6 (12,000 mt/y).

BP CHEMICALS BELGIUM

Antwerp. Products: glycols (130,000 mt/y), ethylene oxide (113,000 mt/y), ld polyethylene (135,000 mt/y).

DOW CHEMICAL

Tessenderlo. Products: polystyrene, hd polyethylene.

DSM
Limburgse Vinyl Mij

Tessenderlo. Feed: ethylene, C12 HCl. Product: vinyl chloride (450,000 mt/y).

ESSOCHEM BELGIUM

Antwerp. Feed: naphtha, middle distillate, reformate. Products: aliphatic-aromatic solvents.

Meerhout. Feed: ethylene. Product: ld polyethylene (244,000 mt/y).

Zwijndrecht. Feed: ethylene. Product: ld polyethylene (255,000 mt/y).

HIMONT BELGIUM NV

Beringen. Feed: propylene. Product: polypropylene (120,000 mt/y).

MONTEFINA.
(50% Himont Italia, 50% Petrofina)

Feluy. Feed: propylene. Products: polypropylene (120,000 mt/y), polystyrene (70,000 mt/y), expandable polystyrene (30,000 mt/y).

PETROCHIM NV
(owned by Phillips Petroleum and Petrofina)

Antwerp. Feed: naphtha. Products: benzene (134,000 mt/y), cyclohexane (105,000 mt/y), ethylene (520,000 mt/y), hd polyethylene (230,000 mt/y), propylene (230,000 mt/y).

PHILLIPS PETROLEUM CHEMICALS

Tessenderlo. Feed: olefins. Product: petrosulfur compounds (13,000 mt/y).

POLYSAR BELGIUM NV

Antwerp. Feed: isobutylene. Products: butyl rubber (85,000 mt/y).

SOCIETE CARBOCHIMIQUE

Tertre. Feed: natural gas, propylene oxide. Products: ammonia (330,000 mt/y), polyethers (36,000 mt/y), urea (190,000 mt/y).

SOLVIC SA

Jemeppe-sur-Sambre. Feed: ethylene. Products: vinyl chloride, polyvinyl chloride.

UCB

Drogenbos. Products: acrylics (15,000 mt/y), polyester (7,000 mt/y).

UCB-FTAL

Ostend and Schoonaarde. Feed: alcohols, cyclohexanol, orthoxylene, phenol. Products: maleic anhydride (3,000 mt/y), phthalic anhydride (80,000 mt/y), plasticizers (80,000 mt/y).

BOLIVIA

YPFB

La Paz. Feed: ethane, propane. Products: ammonia (230,000 mt/y), benzene (170,000 mt/y), ethylene (230,000 mt/y), phenol (20,000 mt/y), ld polyethylene (10,000 mt/y), hd polyethylene (10,000 mt/y), polypropylene (50,000 mt/y), propylene glycol (56,000 mt/y), styrene (70,000 mt/y), urea (370,000 mt/y).

BRAZIL

ALBA AMAZÓNIA SA

Manaus. Feed: methanol. Product: formaldehyde (30,000 mt/y).

ALBA NORDESTE SA

Abreu e Lima. Feed: methanol. Product: formaldehyde (8,000 mt/y).

ALBA QUÍMICA SA

Cotia, S.P. Feed: ethanol, methanol. Products: acetaldehyde (7,200 mt/y), formaldehyde (25,200 mt/y).

Cubatão. Feed: methanol, naphtha. Products: formaldehyde (45,400 mt/y), methanol (33,600 mt/y).

Curitiba, P.R. Feed: methanol. Products: formaldehyde (45,400 mt/y).

Serra. Feed: methanol. Product: formaldehyde (29,700 mt/y).

BANN QUIMICA SA

Ermelino Matarazzo, S.P. Feed: aniline. Product: rubber chemicals (12,800 mt/y).

CAPUAVA CARBONOS INDUSTRIAIS SA

Mauá, São Paulo. Feed: ethylene tar. Product: carbon black (41,200 mt/y).

CIA. DE CARBONOS COLOIDAIS

Candeias, Bahia. Feed: heavy aromatic hydrocarbons. Product: carbon black (56,000 mt/y).

CIQUINE—Cia. Industrias Quimicas do Nordeste

Camaçari, Bahia. Feed: benzene, orthoxylene, phthalic anhydride, 2-ethyl hexanol, propylene. Products: maleic anhydride (6,400 mt/y), phthalic anhydride (28,000 mt/y), plasticizers (10,000 mt/y), propylene (38,800 mt/y).

COMPANHIA BRASILEIRA DE ESTIRENO

Cubatão, S.P. Feed: benzene, ethanol, ethylene. Products: ethylene (4,800 mt/y), ethylbenzene (93,000 mt/y), ethylchloride (500 mt/y), styrene (80,000 mt/y), toluene (3,200 mt/y).

CONSORCIO PAULISTA DE MONOMERO SA

Santo André. Feed: ethylene. Product: vinyl chloride (120,000 mt/y).

COPEBRAS

Cubatão. Feed: heavy aromatic hydrocarbons. Product: furnace carbon black (120,000 mt/y).

COPENE

Camaçari, Bahia. Feed: gas oil, naphtha, natural gas. Products: aromatics (163,000), benzene (172,170 mt/y), butadiene (55,300 mt/y), butylenes (55,800 mt/y), ethylene (460,000 mt/y), orthoxylene (49,000 mt/y), MTBE (60,000 mt/y), paraxylene (86,000 mt/y), propylene (243,450 mt/y), solvent (22,850 mt/y), toluene (66,090 mt/y), xylene mix (30,190 mt/y).

COPENOR

Camaçari. Feed: methanol. Product: formaldehyde (43,000 mt/y).

COPERBO

Cabo, Pernambuco. Feed: alcohol, butadiene, styrene. Products: acetaldehyde (48,000 mt/y), ethylene (32,000 mt/y), polybutadiene (53,000 mt/y), SBR (23,000 mt/y).

COPESUL

Triunfo, RGS. Feed: naphtha. Products: benzene (114,370 mt/y), butadiene (66,027 mt/y), ethylene (420,000 mt/y), propylene (227,310 mt/y), toluene (19,862 mt/y), xylene mix (41,665 mt/y).

ESTIRENO DO NORDESTE SA

Camaçari, Bahia. Feed: benzene, ethylene. Products: ethylbenzene (170,000 mt/y), polystyrene (55,000 mt/y), styrene (120,000 mt/y), toluene (5,400 mt/y).

FISIBA

Camaçari, Bahia. Feed: acrylonitrile. Product: acrylics (13,200 mt/y).

HERCULES INC.

Triunfo. Feed: propylene. Product: polypropylene (50,000 mt/y).

INDUSTRIAS QUIMICAS ELETRO CLORO SA

Santo André. Feed: ethylene, vinyl chloride. Products: ethylene (10,000 mt/y), hd polyethylene (60,000 mt/y), polyvinyl chloride (90,000 mt/y).

METANOR SA—Metanol do Nordeste

Camaçari, Bahia. Feed: carbon dioxide, natural gas. Product: methanol (70,400 mt/y).

NITRIFLEX SA

Duque de Caxias, Rio de Janeiro. Feed: acrylonitrile, butadiene, styrene. Products: ABS-MBS (18,000 mt/y), resins, rubber (17,000 mt/y).

NITROCARBONO SA
(DSM affiliate)

Camaçari. Feed: ammonia, benzene. Products: caprolactam (45,000 mt/y), cyclohexane (5,000 mt/y).

NITROFERTIL

Camaçari, Bahia. Feed: natural gas. Products: ammonia (1,107 mt/d), urea (1,050 mt/d).

Laranjeiras, Sergipe. Feed: natural gas. Products: ammonia (907 mt/d), urea (1,100 mt/d).

OXITENO SA INDUSTRIA E COMERCIO

Camaçari, Bahia. Feed: ethylene, oxygen. Products: ethylene glycol (122,130 mt/y), ethylene oxide (105,000 mt/y).

Mauá, São Paulo. Feed: ethylene, oxygen. Products: ethylene glycol (25,000 mt/y), ethylene oxide (35,000 mt/y).

PETROFLEX

Duque de Caxias. Feed: benzene, ethylene, styrene. Products: butadiene (45,000 mt/y), styrene (60,000 mt/y), SBR (185,000 mt/y).

Triunfo. Product: ethylbenzene (140,000 mt/y), SBR (40,000 mt/y).

PETROQUÍMICA UNIÃO SA

Santo André, Capuava. Feed: naphtha. Products: alkybenzene-9 (7,500 mt/y), alkylbenzene-10 (4,000 mt/y), benzene (133,000 mt/y), butadiene (50,000 mt/y), butylenes (60,000 mt/y), carbon black feedstock (51,000 mt/y), ethylene (360,000 mt/y), orthoxylene (35,000 mt/y), propylene qg (204,000 mt/y), propylene pg (100,000 mt/y), resins (10,000 mt/y), toluene (20,000 mt/y), xylene mix (44,000 mt/y).

POLIALDEN PETROQUÍMICA SA

Camaçari, Bahia. Feed: ethylene. Product: hd polyethylene (80,000 mt/y).

POLIBRASIL

Mauá, São Paulo. Feed: propylene. Product: polypropylene (50,000 mt/y).

POLIOLEFINAS SA

Capuava, Santo André. Feed: ethylene, vinyl acetate. Product: ld polyethylene (110,000 mt/y).

Triunfo, Rio Grande do Sul. Feed: ethylene. Product: ld polyethylene (150,000 mt/y).

POLIPROPILENO SA

Camaçari, Bahia. Feed: propylene. Product: polypropylene (72,000 mt/y).

POLISUL PETROQUIMICA SA

(40% Hoechst AG)

Triunfo. Feed: ethylene. Product: hd polyethylene (80,000 mt/y).

POLITENO

Camaçari, Bahia. Feed: ethylene. Product: ld polyethylene (130,000 mt/y).

PRONOR PETROQUIMICA SA

Camaçari. Feed: methanol, paraxylene, toluene. Products: dimethyl terephthalate (70,000 mt/y), toluene diisocyanate (28,000 mt/y).

RHODIA SA

Paulinia and Santo Andre. Products: acetaldehyde (58,000 mt/y), acetic acid (70,000 mt/y), acetic anhydride (30,000 mt/y), acetone (62,000 mt/y), acetylene (9,000 mt/y), bisphenol A (15,000 mt/y), butanol (6,000 mt/y), isopropanol (7,000 mt/y), nylons (73,000 mt/y), phenol (102,000 mt/y), terephthalic acid (90,000), vinyl acetate (29,000 mt/y).

SALGEMA SA

Maceió, Alagoas. Feed: ethylene, chlorine. Product: ethylene (100,000 mt/y), ethylene dichloride (300,000 mt/y).

ULTRAFERTIL SA

Araucária. Feed: anhydrous ammonia, asphaltic residue, syngas. Product: ammonia (396,000 mt/y), methanol (7,920 mt/y), urea (495,000 mt/y).

Cubatão. Feed: refinery off gases. Product: ammonia (30,000 mt/y).

Plaçaguera. Feed: naphtha, refinery off gases. Product: ammonia (149,820 mt/y).

UNION CARBIDE DO BRASIL LTDA.

Cubatão, São Paulo. Feed: ethylene. Products: ethanol (92,000 mt/y), ethylene (40,000 mt/y), ld polyethylene (128,000 mt/y).

USIMINAS SA

(Usinas Siderúrgicas de Minas Gerais)

Ipatinga. Feed: coke oven gas, coal tar. Products: ammonia (17 t/d), benzene (60 t/d), naphthalene (20 t/d), toluene (8 t/d), xylene mix (2 t/d).

CANADA

ALBERTA GAS CHEMICALS LTD.

(50% Nova, 50% Carma Developers Ltd.)

Medicine Hat, Alberta. Feed: natural gas. Product: methanol (2,400 mt/d).

ALBERTA GAS ETHYLENE CL

Joffre, Alberta. Feed: ethane. Products: butadiene (51,000 mt/y), ethylene (1,224,000 mt/y), propylene (35,000 mt/y).

BASF CANADA LTD.

Cornwall, Ontario. Feed: orthoxylene. Products: phthalic anhydride (40,000 mt/y), plasticizers (25,000 mt/y).

Laval, Que. Feed: styrene. Product: expandable polystyrene (16,000 mt/y).

BORDEN CHEMICAL CANADA

Laval, Quebec. Feed: methanol. Product: formaldehyde (25,000 mt/y).

Edmonton, Alberta. Feed: methanol. Product: formaldehyde (35,000 mt/y).

BORG-WARNER (CANADA) LTD.

Coburg, Ont. Product: ABS (20,000 mt/y).

CABOT CANADA LTD.

Sarnia, Ont. Feed: heavy fuel oil. Product: carbon black (80,000 mt/y).

CANADIAN FERTILIZERS LTD.

Medicine Hat, Alta. Feed: natural gas. Product: ammonia (800,000 mt/y), urea (545,000 mt/y).

CANCARB LTD.

Medicine Hat, Alta. Feed: natural gas. Product: carbon black (20,000 mt/y).

CELANESE CANADA LTD.

Clover Bar (near Edmonton). Feed: butanes, ethylene, natural gas. Products: acetaldehyde (1,700 mt/y), acetic acid (72,000 mt/y), acetic anhydride (27,000 mt/y), acetone (1,700 mt/y), formaldehyde (38,000 mt/y), methanol (750,000 mt/y), vinyl acetate (52,000 mt/y).

CF INDUSTRIES INC.

Medicine Hat, Alberta. Feed: natural gas. Products: ammonia (800,000 mt/y), urea (545,000 mt/y).

C-I-L INC.

Courtright, Ont. Feed: natural gas. Product: ammonia (350,000 mt/y), urea (140,000 mt/y).

Edmonton, Alta. Feed: ethylene. Product: ld polyethylene (70,000 mt/y).

COLUMBIAN CHEMICALS CO.

Hamilton, Ont. Feed: heavy aromatic hydrocarbons. Product: furnace carbon black (70,000 mt/y).

COMINCO LTD.

Calgary, Alta. Feed: natural gas. Product: ammonia (110,000 mt/y).

Carseland, Alta. Feed: natural gas. Product: ammonia (410,000 mt/y), urea (480,000 mt/y).

Trail, B.C. Feed: natural gas. Product: ammonia (66,000 mt/y).

COMMERCIAL ALCOHOLS LTD.

Varennes, Que. Feed: ethylene. Product: ethanol (55,000 mt/y).

CYANAMID CANADA INC.

Niagara Falls, Ont. Feed: natural gas. Products: ammonia (210,000 mt/y), urea (90,000 mt/y).

DIAMOND SHAMROCK ALBERTA GAS LTD.

(50% Novacor Chemicals Ltd., 50% Diamond Shamrock Corp.)

Fort Saskatchewan. Feed: vinyl chloride. Product: polyvinyl chloride (100,000 mt/y).

DOW CHEMICAL OF CANADA INC.

Fort Saskatchewan, Alta. Feed: ammonia, brine, caustic, chlorine, ethylene. Products: ethanolamines, ethylene dichloride, ethylene glycol, ethylene oxide, vinyl chloride.

Sarnia, Ont. Feed: benzene, butadiene, chlorine, ethylene, propylene. Products: ethylbenzene, ethylene dichloride, ld and hd polyethylene, polystyrene, propylene glycol, propylene oxide, styrene, vinyl chloride, SBR.

Varennes, Que. Feed: butadiene, styrene. Product: SBR.

DU PONT CANADA INC.

Corunna, Ont. Feed: ethylene. Product: ld & hd polyethylene (235,000 mt/y).

ESSO CHEMICAL CANADA

(Division of Imperial Oil)

Ioco, B.C. Feed: naphtha. Product: toluene (48,750 mt/y).

Redwater, Alberta. Feed: natural gas. Products: ammonia (770,000 mt/y), urea (500,000 mt/y).

Sarnia, Ontario. Feed: natural gas liquids. Products: BTX (240,000 mt/y), carbon black (79,401 mt/y), ethylene (220,000 mt/y), polyethylene (135,000 mt/y), polyvinyl chloride (100,000 mt/y), propylene (74,863 mt/y).

ETHYL CANADA INC.

Corunna, Ont. Feed: ethylene. Products: ethyl chloride (36,000 mt/y), ethylene dichloride (12,000 mt/y).

GULF CANADA PRODUCTS CO.

Montreal East, Que. Feed: crude oil. Products: acetone (17,000 mt/y), benzene (125,000 mt/y), cumene (55,000 mt/y), cyclohexane (110,000 mt/y), isopropanol (300 mt/y), phenol (28,000 mt/y), propylene (37,000 mt/y), solvents (5,500 mt/y), xylene mix (35,000 mt/y).

HIMONT CANADA INC.

Varennes, Quebec. Feed: propylene. Product: polypropylene (68,000 mt/y).

NITROCHEM INC.

Maitland, Ontario. Feed: natural gas. Products: ammonia (80,000 mt/y).

NOVACOR CHEMICALS LTD.

Joffre, Alberta. Feed: ethylene. Product: ld polyethylene (270,000 mt/y).

OCELOT INDUSTRIES LTD.

Kitimat, B.C. Feed: natural gas. Product: methanol (1,200 mt/d).

PETRO-CANADA PRODUCTS

Pointe-Aux-Trembles. Feed: crude oil. Products: aromatics (150,000 mt/y), benzene (150,000 mt/y), orthoxylene (25,000 mt/y), normal paraffins (25,000 mt/y), polyisobutylene (11,000 mt/y), toluene (150,000 mt/y), xylene mix (150,000 mt/y).

PETROSAR LTD.

Corunna, Ont. Feed: heavy atm. gas oil from crude and condensate, naphtha. Products: aromatics mix (125,000 mt/y), benzene (140,000 mt/y), butadiene (90,000 mt/y), butylenes (130,000 mt/y), ethylene (455,000 mt/y), propylene (330,000 mt/y).

POLYSAR LTD.

Cambridge, Ont. Feed: styrene. Product: polystyrene (37,000 mt/y).

Pointe-Aux-Trembles. Feed: styrene. Product: polystyrene (38,000 mt/y).

Sarnia, Ont. Feed: acrylonitrile, benzene, C_4 streams, ethylene, ethylbenzene, light oil. Products: styrene (270,000 mt/y), SBR-NBR-BR-IIR (262,000 mt/y), toluene (13,000 mt/y).

RECOCHEM INC.

Napierville, Que. Products: benzene (20,000 mt/y), naphthalene (25,000 mt/y), toluene, xylene.

REICHHOLD LTD.

North Bay, Ont. Feed: methanol. Product: formaldehyde (100,000 mt/y).

Port Moody, B.C. Feed: methanol. Product: formaldehyde (15,500 mt/y).

Ste. Therese, Que. Feed: methanol. Product: formaldehyde (15,500 mt/y).

Thunder Bay, Ont. Feed: methanol. Products: formaldehyde (55,000 mt/y).

SHELL CANADA LTD.

Montreal East, Que. Feed: isopropyl alcohol. Product: acetone (16,000 mt/y).

Sarnia, Ont. Feed: reformate, propylene. Products: benzene (59,000 mt/y), isopropanol (91,000

mt/y), polypropylene (80,000 mt/y), toluene (60,000 mt/y), xylene mix (77,000 mt/y).
Scotford, Alta. Feed: benzin, ethylene. Product: styrene monomer (307,000 mt/y).

SHERRITT GORDON MINES LTD.
Fort Saskatchewan, Alta. Feed: natural gas. Products: ammonia (490,000 mt/y), urea (393,000 mt/y).

SIMPLOT CHEMICAL CL
Brandon, Man. Feed: natural gas. Products: ammonia (550 mt/d), urea (480 mt/d).

SUNOCO
Sarnia. Feed: reformate. Products: benzene (48,000 mt/y), orthoxylene (37,000 mt/y), toluene (180,000 mt/y), xylene mix (140,000 mt/y).

TEXACO CANADA INC.
Port Credit, Ont. Feed: refinery fractions. Products: benzene (18,000 mt/y), n-paraffins (13,500 mt/y), toluene (19,800 mt/y), xylene mix (11,800 mt/y).

UNION CARBIDE CANADA LTD.
Montreal East, Que. Feed: ethylene. Products: ethylene glycol (82,000 mt/y), ethylene oxide (80,000 m/ty).
Red Deer, Alta. Product: ethylene glycol (250 mt/d).
Sarnia, Ont. Feed: polyethylene. Products: ld-hd polyethylene (215,000 mt/y).

WESTERN CO-OPERATIVE FERTILIZERS LTD.
Calgary, Alta. Feed: natural gas. Products: ammonia (200 mt/d).
Medicine Hat, Alta. Feed: natural gas. Product: ammonia (180 mt/d).

CHILE

PETROX SA
Talcahuano. Feed: naphtha. Product: ethylene (60,000 mt/y).

CHINA, TAIWAN

CHANG CHUN PETROCHEMICAL CL
Miaoli. Feed: acetic acid, n-iso-butanols. Product: acetic acid (36,000 mt/y), butyl acetate (24,000 mt/y), formaldehyde (25,000 mt/y), polyvinyl alcohol (36,000 mt/y).

CHANG CHUN PLASTICS CL
Shin-Tsu. Feed: methanol. Product: formaldehyde (50,000 mt/y).

CHINA AMERICAN PETROCHEMICAL CL
Lin Yuan. Feed: PTA. Product: terephthalic acid (430,000 mt/y).

CHINA PETROCHEMICAL DEVELOPMENT CORP.
Kaohsiung. Feed: cyclohexane. Products: caprolactam (50,000 mt/y).
Ta-She. Feed: ammonia, propylene, syngas. Product: acetic acid (60,000 mt/y), acrylonitrile (132,000 mt/y), methanol (66,000 mt/y).
Toufen. Feed: benzene, ethane. Product: caprolactam (50,000 mt/y), ethylene, (54,000 mt/y).

CHINA SYNTHETIC RUBBER CORP.
(subsidiary of Witco Chemical Corp.)
Kaohsiung. Feed: indigenous E.B. Product: carbon black (45,000 mt/y).

CHINESE PETROLEUM CORP.
Kaohsiung. Feed: gas oil, naphtha. Products: benzene (194,000 mt/y), butadiene (130,000 mt/y), cyclohexane (60,000 mt/y), ethylene (899,000 mt/y), orthoxylene (60,000 mt/y), paraxylene (200,000 mt/y), propylene (485,000 mt/y).

CHIUNGLONG PETROCHEMICAL CL
Kaohsiung. Products: polypropylene glycol (15,000 mt/y), propylene glycol (5,600 mt/y), propylene oxide (15,000 mt/y).

DAIREN CHEMICAL CORP.
Kaohsiung. Feed: acetic acid, ethylene. Product: ethyl acetate (20,000 mt/y), vinyl acetate (85,000 mt/y).

FORMOSA PLASTICS CORP.
Kaohsiung. Products: acrylics (80,000 mt/y), hd polyethylene (120,000 mt/y), polyvinyl chloride (538,000 mt/y), vinyl chloride (480,000 mt/y).

FORMOSAN UNION CHEMICAL CORP.
Lin Yuan. Feed: benzene, n-olefin, propylene tetramer. Product: alkylbenzene (50,000 mt/y).

GRAND PACIFIC PETROCHEMICAL CORP.
Ta-She, Kaohsiung. Feed: acrylonitrile, benzene, butadiene, ethylene. Products: ABS (200,000 mt/y), styrene (200,000 mt/y).

LEE CHANG YUNG CHEMICAL INDUSTRY CORP.
Hsin-Chu. Feed: natural gas. Products: formaldehyde (100,000 mt/y).
Lin-Yuan. Feed: ethylene, propylene. Products: acetaldehyde (40,000 m/ty), acetone (20,000 mt/y), isopropanol (30,000 mt/y), methanol (65,000 mt/y).

ORIENTAL UNION CHEMICAL CORP.
Kaoshiung. Feed: ethylene. Products: ethylene glycol (150,000 mt/y), ethylene oxide (115,000 mt/y).

TAIWAN FERTILIZER CO.
Miaoli. Feed: natural gas. Products: ammonia (300,000 mt/y), urea (186,000 mt/y).

TAIWAN POLYPROPYLENE CL
Kaohsiung. Feed: ethylene, propylene. Product: polypropylene (120,000 mt/y).

TAIWAN SYNTHETIC RUBBER CORP.
Ta-She, Kaohsiung. Feed: butadiene, styrene. Products: polybutadiene (40,000 mt/y), SBR (100,000 mt/y).

USI FAR EAST CORP.
Kaohsiung. Feed: ethylene. Product: hd polyethylene (50,000 mt/y), ld polyethylene (140,000 mt/y).

COLOMBIA

AMONIACO DEL CARIBE SA
Cartagena. Feed: natural gas. Product: ammonia (350 mt/d).

CABOT COLOMBIANA SA
(subsidiary of Cabot Corp., Boston, Mass., U.S.A.)
Mamonal, Cartagena. Feed: aromatic tar, natural gas. Product: carbon black (17,000 mt/y).

CARBOQUIMICA SA.
Bogota. Feed: orthoxylene, oxoalcohols, coal tar. Products: benzene (2,000 mt/y), naphthalene (1,000 mt/y), phthalic anhydride (12,000 mt/y), plasticizers (20,000 mt/y), solvents (3,000 mt/y), toluene (2,000 mt/y), xylene mix (2,500 mt/y).

CIA. QUIMICA BORDEN SA
Yumbo, Valle. Feed: methanol. Products: formaldehyde (9,200 mt/y).

DOW COLOMBIANA SA
Cartagena. Feed: styrene. Product: polystyrene (12,500 mt/y).

EMPRESA COLOMBIANA DE PETROLEOS
Barrancabermeja. Feed: refinery products. Products: alkylbenzene (15,000 mt/y), benzene (43,000 mt/y), cyclohexane (20,000 mt/y), ethylene (115,000 mt/y), orthoxylene (8,000 mt/y), ld polyethylene (55,000 mt/y), propylene (5,500 mt/y), toluene (20,000 mt/y), xylene mix (36,000 mt/y), solvents (50,000 mt/y).

MONOMEROS COLOMBO VENEZOLANOS SA
(DSM affiliate)
Barranquilla. Feed: cyclohexane. Product: caprolactam (22,000 mt/y).

PETROQUIMICA COLOMBIANA SA
Mamonal, Cartagena. Feed: vinyl chloride. Products: polyvinyl chloride (82,000 mt/y).

POLICOLSA (owned [illegible] Ecopetrol)
Barrancabermeja. Feed: natural gas, cracking gases. Products: ethylene (100,000 mt/y), ld polyethylene (55,000 mt/y), propylene (9,000 mt/y).

PRODUCTOS PETROQUIMICOS
Yumbo. Feed: aromatic tar, coal tar fractions. Product: carbon black (18,000 mt/y).

ECUADOR

CIA. QUIMICA BORDEN EQUATORIANA SA
Quito. Feed: methanol. Products: formaldehyde (9,200 mt/y).

EGYPT

SOC. EL NASR D'ENGRAIS ET D'INDUSTRIES CHIMIQUES
Talkha. Feed: natural gas. Product: urea (570,000 mt/y).

FINLAND

KEMIRA OY
Oulu. Feed: heavy fuel oil. Products: ammonia (85,000 mt/y), formic acid (20,000 mt/y), urea (100,000 mt/y).

NESTE OY
Porvoo. Feed: alcohols, benzene, cumene, ethylene, FCC gas, glycols, naphtha, n-hexane, n-pentane, orthoxylene, phthalic anhydride, propylene, pyrolysis gasoline, reformate, styrene, vacuum gas oil, vinyl chloride. Products: acetone (30,000 mt/y), benzene (115,000 mt/y), butadiene (20,000 mt/y), cumene (70,000 mt/y), ethylene (200,000 mt/y), phthalic anhydride (20,000 mt/y), phenol (50,000 mt/y), plasticizers (10,000 mt/y), polyester (10,000 mt/y), ld polyethylene (175,000 mt/y), polystyrene (20,000 mt/y), polyvinyl chloride (60,000 mt/y), propylene (90,000 mt/y).

SUOMEN POLYSTYREENI TEHDAS OY
(100% Neste Oy)
Kokemaki. Feed: styrene. Product: polystyrene (10,000 mt/y).

FRANCE

ALTULOR
(100% CdF Chimie)
Bernouville. Feed: methylmethacrylate. Product: acrylics (13,000 mt/y).
Saint Avold. Feed: methylmethacrylate. Product: acrylics (4,000 mt/y).

AMMONIAC DE GRAND QUEVILLY
(67% CDF-AZF, 33% Cofaz)
Grand Quevilly (near Rouen). Feed: natural gas. Product: ammonia (1,000 mt/d).

AMMONIAC SARRO-LORRAIN
(52% APC, 27% CSL, 15% Norsolor)
Carling. Feed: natural gas. Product: ammonia (330,000 mt/y).

APC GESA
(100% CdF Chimie)
Mazingarbe. Feed: coke oven gas, naphtha. Products: ammonia (220,000 mt/y).
Toulouse. Feed: natural gas. Products: ammonia (445,000 mt/y), urea (150,000 mt/y).

ASHLAND CHEMICAL FRANCE
Port Jerome. Feed: aromatic oils. Product: carbon black (88,000 mt/y).

ATOCHEM
Balan (Ain). Feed: ethylene, vinyl chloride. Product: ld polyethylene (120,000 mt/y), polyvinyl chloride (120,000 mt/y).

Brignoud (Isère). Feed: vinyl chloride. Products: polyvinyl chloride (100,000 mt/y).

Chauny. Feed: naphthalene, orthoxylene. Product: phthalic anhydride (80,000 mt/y).

Feyzin. Feed: naphtha. Products: aromatics (115,000 mt/y), butadiene (50,000 mt/y), ethylene (200,000 mt/y), propylene (115,000 mt/y). Note: Atochem share is 57.4% at this location.

Gonfreville l'Orcher. Feed: naphtha. Products: benzene (150,000 mt/y), butadiene (60,000 mt/y), ethylbenzene (280,000 mt/y), ethylene (375,000 mt/y), ld polyethylene (160,000 mt/y), hd polyethylene (80,000 mt/y), polypropylene (85,000 mt/y), polystyrene (150,000 mt/y), propylene (190,000 mt/y), styrene (250,000 mt/y).

La Chambre (Savoie). Feed: acetone, ethanol, 2-butanol. Product: solvents (103,000 mt/y).

Lannemezan (Hautes Pyrénées). Product: formaldehyde.

Lavera. Feed: propylene. Products: propylene glycol (40,000 mt/y), propylene oxide (65,000 mt/y), vinyl chloride (360,000 mt/y).

Mont (near Lacq). Feed: ethylene. Product: ld polyethylene (75,000 mt/y).

Notre Dame de Gravenchon (Seine Maritime). Feed: n-butenes. Product: 2-butanol (50,000 mt/y).

Saint Auban. Products: polyvinyl chloride (115,000 mt/y), vinyl chloride (120,000), solvents.

Saint Fons. Product: polyvinyl chloride (175,000 mt/y).

AZOLACQ

(50% Cofaz, 50% CdF Chimie AZF)

Oissel. Feed: ammonia, carbon dioxide. Product: urea (360 mt/d).

BAYER ELASTOMÈRES

Lillebonne. Feed: butadiene, styrene. Products: polybutadiene (50,000 mt/y), SBR (18,000 mt/y), SBR latex (24,000 mt/y).

BP CHEMICALS LTD.

Wingles. Products: polystyrene (115,000 mt/y), expandable polystyrene (25,000 mt/y).

BP CHIMIE

Lavéra, Martigues. Feed: GPL, naphtha. Products: benzene (85,000 mt/y), butadiene (50,000 mt/y), ethylene (240,000 mt/y), ethylene glycol (165,000 mt/y), ethylene oxide (150,000 mt/y), polyisobutylene (36,000 mt/y), polyethylene (90,000 mt/y), polypropylene (80,000 mt/y), propylene (155,000 mt/y).

CDF CHIMIE AZF

(48% CDF-AZF, 42% Cofaz, 10% Rhone-Poulenc)

Grand Quevilly (near Rouen). Feed: natural gas. Product: ammonia (1,000 mt/d).

CdF CHIMIE EP

Carling. Feed: benzols, crude oil, gazole, naphtha. Products: benzene (330,000 mt/y), cyclohexane (55,000 mt/y), ethylene (440,000 mt/y), ld polyethylene (220,000 mt/y), propylene (220,000 mt/y), styrene (220,000 mt/y).

Harnes (Pas-de-Calais). Products: oxoalcohols (130,000 mt/y).

Lillebonne. Feed: ethylene. Product: lld polyethylene (90,000 mt/y).

Villers Saint Paul (Oise). Feed: natural gas, oxoalcohols, orthoxylene, benzene, styrene. Products: maleic anhydride (14,000 mt/y), phthalic anhydride (15,000 mt/y), polyester (30,000 mt/y), expandable polystyrene (45,000 mt/y), plasticizers (80,000 mt/y).

Villers Saint Sepulcre (Oise). Product: ABS (50,000 mt/y).

CIE. CHIMIQUE DE LA MEDITERRANEE

(joint venture of BASF and Shell group)

Berre l'Etang. Feed: ethylene. Product: ld polyethylene (105,000 mt/y).

CIE. DU POLYISOPRENE SYNTHETIQUE

Oudalle. Feed: C-5's, isoprene. Products: isoprene-azeotrope (45,000 mt/y), polyisoprene (45,000 mt/y).

CIE. FRANCAISE DE RAFFINAGE

Gonfreville l'Orcher. Feed: crude. Products: benzene (70,000 mt/y), propylene oligomers (40,000 mt/y), toluene (7,000 mt/y).

COFAZ

Pardies (Pyrenees Atlantiques). Feed: natural gas. Products: ammonia (400 mt/d).

Soulom (Hautes Pyrenees). Feed: natural gas. Products: ammonia (710 mt/d), urea (300 mt/d).

COPENOR-Compagnie Petrochimique du Nord

(60% CdF Chimie)

Dunkerque. Feed: naphtha, gazole, LPG. Products: ethylene (225,000 mt/y), ld polyethylene (180,000 mt/y), propylene (110,000 mt/y).

ESSO CHIMIE

Notre Dame de Gravenchon. Feed: refinery products. Products: butadiene (70,000 mt/y), ethylene (300,000 mt/y), propylene (220,000 mt/y), solvents (60,000 mt/y).

GROUPE ELF AQUITAINE

(Societe Nationale Elf Aquitaine)

Lacq. Feed: natural gas. Products: benzene (95,000 mt/y), cyclohexane (30,000 mt/y), ethylbenzene (60,000 mt/y), ethylene (110,000 mt/y), styrene (50,000 mt/y), solvents (15,000 mt/y).

HGD—Huiles, Goudrons et Derivés

(94% CdF Chimie)

Mariénau. Feed: coal tars. Product: naphthalene (15,000 mt/y).

Vendin le Vieil. Feed: coal tars. Product: phthalic anhydride (12,000 mt/y).

ICI LTD.

Balycourt. Product: plasticizers.

Fos-sur-Mer. Product: ld polyethylene (100,000 mt/y).

METHANOLACQ

Pardies. Feed: residual natural gas. Product: methanol (120,000 mt/y).

NORSOLOR

(100% CdF Chimie)

Saint Avold. Feed: ammonia, propylene. Products: acrylics (60,000 mt/y), acrylonitrile (90,000 mt/y), acrylates (165,000 mt/y).

ORGANICHIM.

(83% Cdf Chimie group: 69% STS, 14% CdF)

Mazingarbe. Product: formaldehyde (25,000 mt/y).

Premery. Product: formaldehyde (12,000 mt/y).

Villers St. Paul. Product: formaldehyde (50,000 mt/y).

PEC-RHIN

(50% APC, 50% BASF)

Ottmarsheim. Feed: natural gas. Product: ammonia (180,000 mt/y).

PETERLITE

(80% Norsolor)

Clairvaux les Lacs. Product: acrylics (1,100 mt/y).

PETROSYNTHESE SA

(35% Chevron Chemical Co., 35% CFR, 30% Rhone-Poulenc)

Gonfreville. Feed: benzene, propylene. Products: alkylbenzene (100,000 mt/y).

PHILBLACK FRANCE SA

(subsidiary of Phillips Petroleum Co.)

Bordeaux. Feed: heavy aromatic oil. Product: carbon black (66,000 mt/y).

POLYSAR FRANCE SA.

Strasbourg. Feed: acrylonitrile, styrene, butadiene. Product: SBR, latex (160,000 mt/y).

PRODELEC

(100% Atochem)

Pont de Claix (Isère). Feed: propylene. Product: acetone (54,000 mt/y), bisphenol A (45,000 mt/y), cumene (125,000 mt/y), phenol (90,000 mt/y).

SHELL CHIMIE

Berre. Products: alkylbenzene (42,000 mt/y), benzene (60,000 mt/y), butadiene (75,000 mt/y), butanol (45,000 mt/y), ethylene (380,000 mt/y), isopropanol (108,000 mt/y), polybutadiene (50,000 mt/y), polypropylene (100,000 mt/y), polystyrene (50,000 mt/y), polyvinyl chloride (145,000 mt/y), propylene (190,000 mt/y), toluene (15,000 mt/y), SBR (85,000 mt/y), TR (30,000 mt/y), xylene mix (8,000 mt/y).

Pauillac. Feed: benzene, propylene. Product: cumene (110,000 mt/y).

SOCABU-SOCIETE DU CAOUTCHOUC BUTYL

Notre Dame de Gravenchon. Feed: refinery products. Products: butyl rubber (52,000 mt/y), ethylene-propylene rubber (50,000 mt/y).

SOCIÉTÉ ARTESIENNE DE VINYLE

(DSM subsidiary)

Mazingarbe. Product: polyvinyl chloride (160,000 mt/y).

SOCIÉTÉ CHIMIQUE DE DIEUZE

(75% CdF Chimie EP)

Dieuze. Feed: styrene. Product: polystyrene (110,000 mt/y).

Ribecourt. Feed: styrene. Product: polystyrene (55,000 mt/y).

SOCIÉTÉ DES ENGRAIS DE L'ILE DE FRANCE

(50% APC, 50% Grande Paroisse)

Nangis. Feed: natural gas. Product: ammonia (300,000 mt/y).

SOCIÉTÉ DU CHLORURE DE VINYLE DE FOS

(60% Shell Chimie, 40% Atochem)

Fos sur Mer (Bouches du Rhône). Feed: chlorine, ethylene. Product: vinyl chloride (200,000 mt/y).

SOCIÉTÉ FRANCAISE HOECHST

Cuise-LaMotte. Feed: methanol. Product: formaldehyde (12,000 mt/y).

Lillebonne. Feed: ethylene, propylene. Product: acetaldehyde (98,000 mt/y), polypropylene (70,000 mt/y).

SOCIÉTÉ NORMANDE DE L'AZOTE

(56% Cofaz, 44% APC)

Gonfreville. Feed: naphtha, natural gas. Products: ammonia (330,000 mt/y), urea (250,000 mt/y).

SOCIÉTÉ TOULOUSAINE DE SYNTHESE

(75% CdF Chimie, 25% APC)

Toulouse. Feed: methanol, urea. Products: formaldehyde (35,000 mt/y), melamine (12,000 mt/y).

SODES—Société d'Ethanol de Synthèse

(30% Atochem, 45% Rhone Poulenc, 25% SFECI)

Lillebonne. Product: ethanol (100,000 mt/y).

SOLVIC SA.

Tavaux. Feed: ethylene. Products: polyvinyl chloride, vinyl chloride.

SOLVAY & CIE.

Sarralbe. Feed: ethylene, propylene. Products: hd polyethylene, polypropylene.

USINES LAMBIOTTE

(100% Atochem)

Premery. Product: acetic acid (3,500 mt/y).

GERMANY

AMH CHEMIE

Brunsbuettel. Feed: residue. Products: ammonia (550,000 mt/y), urea (330,000 mt/y).

BASF AG

Ludwigshafen. Feed: fuel oil, naphtha, natural gas. Products: acetic acid (40,000 mt/y), acetylene (85,000 mt/y), acrylic acid (210,000 mt/y), ammonia (700,000 mt/y), butanols (220,000 mt/y), caprolactam (150,000 mt/y), ethylbenzene (350,000 mt/y), ethylene (450,000 mt/y), ethylene oxide (150,000 mt/y), formaldehyde (1,200,000 mt/y), melamine (40,000 mt/y), methanol (220,000 mt/y), higher oxoalcohols (50,000 mt/y), 2-ethylhexanol (180,000 mt/y), phthalic anhydride (90,000 mt/y), polyamide (85,000 mt/y), ld polyethylene (18,000 mt/y), polyisobutylene (6,000 mt/y), polypropylene (10,000 mt/y), polystyrene (265,000 mt/y), polyvinyl chloride (150,000 mt/y), propanol (25,000 mt/y), propylene (240,000 mt/y), propylene glycol (40,000 mt/y), propylene oxide (75,000 mt/y), styrene (500,000 mt/y), urea (480,000 mt/y), vinyl chloride (100,000 mt/y), plasticizers (220,000 mt/y).

BAYER AG

Leverkusen. Products: aniline (300,000 mt/y), formaldehyde (95,000 mt/y), maleic anhydride (10,000 mt/y), phthalic anhydride (40,000 mt/y).

BP BENZIN UND PETROLEUM AG UND CALIFORNIA CHEMICAL GmbH oHG.

(owned jointly by Chevron Chemical Company and BP Benzin und Petroleum AG)

Dinslaken. Feed: reformate. Products: orthoxylene (24,000 mt/y), paraxylene (20,000 mt/y).

BUNAWERKE HULS GmbH

Marl. Products: butadiene (120,000 mt/y), polybutadiene (70,000 mt/y), SBR (180,000 mt/y), EPR (25,000 mt/y).

CABOT GmbH

Hanau. Feed: petroleum fractions, natural gas. Product: carbon black (50,000 mt/y).

CHEMISCHE WERKE HULS

Marl. Products: acetaldehyde (80,000 mt/y), acetylene (120,000 mt/y), alkylbenzene (80,000 mt/y), butylenes (30,000 mt/y), cumene (110,000 mt/y), ethanol (130,000 mt/y), ethylbenzene (260,000 mt/y), ethylene (50,000 mt/y), ethyl chloride (22,000 mt/y), ethylene glycol (90,000 mt/y), ethylene oxide (150,000 mt/y), isopropanol (110,000 mt/y), maleic anhydride (30,000 mt/y), phthalic anhydride (190,000 mt/y), polyamide 12 (14,000 mt/y), polyester (21,000 mt/y), polyethylene (16,000 mt/y), polypropylene (120,000 mt/y), polystyrene (115,000 mt/y), polysytrene-EPS (60,000 mt/y), polyvinyl chloride (380,000 mt/y), propylene glycol (21,000 mt/y), propylene oxide (27,000 mt/y), styrene (250,000 mt/y), vinyl chloride (380,000 mt/y), plasticizers (190,000 mt/y).

CHEMISCHE WERKE SAARLOTHRINGEN

(100% CdF Chimie)

Perl/Besch. Feed: ammonia, carbon dioxide, methanol. Products: formaldehyde (43,000 mt/y), urea (200,000 mt/y).

COLUMBIAN CARBON DEUTSCHLAND

Hamburg. Feed: heavy aromatic hydrocarbons. Product: furnace carbon black (30,000 mt/y).

CONDEA CHEMIE GmbH

(owned by Conoco Inc. and Deutsche Texaco AG)

Brunsbüttel. Feed: ethylene, hydrogen. Products: synthetic straight chain primary fatty alcohols (75,000 mt/y).

DEGUSSA AG

Bruchhausen. Feed: methyl alcohol. Product: formaldehyde.

Kalscheuren. Feed: aromatic hydrocarbons, coal tar oil. Product: carbon black.

Mainz-Mombach. Feed: methyl alcohol. Product: formaldehyde.

DEUTSCHE MARATHON PETROLEUM GmbH

(subsidiary of Marathon Petroleum Co.)

Burghausen, Bavaria. Feed: refinery streams. Products: benzene (110,000 mt/y), butadiene (80,000 mt/y), ethylene (280,000 mt/y), propylene (130,000 mt/y).

DEUTSCHE SHELL AG

Godorf. Feed: pyrolysis gasoline, reformate. Products: benzene (400,000 mt/y), orthoxylene (100,000 mt/y), paraxylene (75,000 mt/y), toluene (10,000 mt/y).

DEUTSCHE SOLVAY-WERKE GmbH

Rheinberg. Feed: ethylene. Products: polyvinyl chloride, vinyl chloride.

DEUTSCHE TEXACO AG

Heide. Feed: refinery products. Products: benzene (34,000 mt/y), butylenes (28,000 mt/y), ethylbenzene (11,000 mt/y), ethylene (80,000 mt/y), MTBE (12,500 mt/y), orthoxylene (12,000 mt/y), parametaxylene (38,000 mt/y), propylene (55,000 mt/y), toluene (75,000 mt/y).

Meerbeck und Homberg. Feed: refinery products and chemicals. Products: acetone (36,000 mt/y), alkylbenzene (25,000 mt/y), alkyl chlorides (2,000 mt/y), isopropanol (140,000 mt/y), maleic anhydride (7,500 mt/y), plasticizers (24,000 mt/y), resins (36,000 mt/y), alcohols-ketones (99,000 mt/y).

DOW CHEMICAL

Rheinmuenster. Products: SB-latex, resins.

Stade. Products: bisphenol, propylene oxide, propylene glycol, resins, solvents.

DYNAMIT NOBEL AG

Luisdorf. Products: dimethyl terephthalate (330,000 mt/y), ethylene dichloride (100,000 mt/y).

Rheinfelden. Product: plasticizers (8,000 mt/y).

Steyerberg. Product: dimethyl terephthalate (150,000 mt/y).

Witten. Products: polyamide (1,200 mt/y), polyester (7,000 mt/y).

EC ERDOLCHEMIE GmbH

(owned by Bayer AG and Deutsche BP AG)

Worringen, Cologne. Feed: naphtha. Products: acrylonitrile (280,000 mt/y), ammonia (300,000 mt/y), aromatics mix (200,000 mt/y), butadiene (245,000 mt/y), butylenes (90,000 mt/y), ethanol (50,000 mt/y), ethylene (740,000 mt/y), ethylene glycol (150,000 mt/y), ethylene oxide (150,000 mt/y), propylene (520,000 mt/y), propylene glycol (12,000 mt/y), propylene oxide (135,000 mt/y), toluene (100,000 mt/y).

ESSO CHEMIE GmbH

Cologne. Feed: refinery stocks. Products: butadiene (20,000 mt/y), butylenes (18,000 mt/y), ethylene (450,000 mt/y), polyisobutylene (45,000 mt/y), propylene (240,000 mt/y).

Hamburg. Feed: refinery. Product: solvents (100,000 mt/y).

HOECHST AG

Frankfurt-Hoechst. Feed: ethylene, propylene, natural gas. Products: acetaldehyde (130,000 mt/y), acetic acid (145,000 mt/y), vinyl acetate (150,000 mt/y), hd polyethylene (195,000 mt/y), polyvinyl alcohol (25,000 mt/y).

Gendorf. Feed: ethylene. Products: ethylene glycol-ethylene oxide (120,000 mt/y), vinyl chloride (110,000 mt/y), polyvinyl chloride (150,000 mt/y).

Gersthofen. Feed: p-xylene, methanol. Product: dimethyl terephthalate (115,000 mt/y).

Kelsterbach. Feed: olefins. Products: ethylene glycol-ethylene oxide (45,000 mt/y), polypropylene (135,000 mt/y).

Knapsack. Feed: olefins. Products: acetaldehyde (120,000 mt/y), acetic acid (70,000 mt/y), acetic anhydride (80,000 mt/y), polypropylene (85,000 mt/y), hd polyethylene (100,000 mt/y), polyvinyl chloride (90,000 mt/y), vinyl chloride (100,000 mt/y).

Muenchsmuenster. Feed: ammonia, ethylene, propylene. Products: acrylonitrile (90,000 mt/y), hd polyethylene (80,000 mt/y).

Offenbach. Feed: p-xylene/methanol. Product: dimethyl terephthalate (95,000 mt/y).

ICI

Waldshut. Product: polyvinyl chloride (80,000 mt/y).

Wilhelmshaven. Product: polyvinyl chloride (115,000 mt/y).

PHENOLCHEMIE GmbH

Gladbeck. Feed: cumene. Products: acetone (250,000 mt/y), phenol (400,000 mt/y), AM styrene (20,000 mt/y).

PHILLIPS PETROLEUM INTERNATIONAL GmbH

Hannover. Feed: aromatic oils. Product: carbon black (50,000 mt/y).

RHEINISCHE OLEFINWERKE GmbH

Wesseling. Feed: gas oil, naphtha. Products: butadiene (150,000 mt/y), ethylene (650,000 mt/y), ethylbenzene (430,000 mt/y), ld polyethylene (400,000 mt/y), hd polyethylene (215,000 mt/y), polyisobutylene (7,000 mt/y), polypropylene (130,000 mt/y), propylene (300,000 mt/y), styrene (420,000 mt/y), TR rubber (30,000 mt/y).

RUHRCHEMIE AG

Oberhausen, Holten. Feed: olefins. Products: oxoalcohols (335,000 mt/y), ld and hd polyethylene (270,000 mt/y).

RUHR OEL GMBH

(50% Veba Oel AG, 50% Petróleos de Venezuela SA)

Gelsenkirchen. Feed: crude oil, refinery products. Products: ammonia (400,000 mt/y), benzene (310,000 mt/y), cumene (330,000 mt/y), cyclohexane (100,000 mt/y), ethylene (400,000 mt/y), methanol (200,000 mt/y), orthoxylene (115,000 mt/y), n-paraffins (100,000 m/ty), paraxylene (120,000 mt/y), phthalic anhydride (65,000 mt/y), propylene (245,000 mt/y), toluene (90,000 mt/y).

UNION RHEINISCHE BRAUNKOHLEN KRAFTSTOFF AG

Wesseling. Feed: LPG, natural gas, pyrolysis gasoline, reformate, resid, refinery gas, xylene mix. Products: benzene (120,000 mt/y), ethylene (440,000 mt/y), methanol (400,000 mt/y), orthoxylene (32,000 mt/y), paraxylene (72,000 mt/y), propylene (260,000 mt/y), toluene (80,000 mt/y), xylene mix (62,000 mt/y).

VEBA OEL AG

Münchsmünster. Feed: LPG, naphtha. Products: ethylene (200,000 m/ty), propylene (130,000 mt/y).

WACKER-CHEMIE GmbH

Burghausen/Obb. Feed: ethylene. Products: acetaldehyde, acetic acid, acetic anhydride, ethylene dichloride, plasticizers, polyvinyl alcohol, polyvinyl chloride, vinyl acetate, vinyl chloride, solvents.

WINTERSHALL AG

Ibbenbüren. Feed: benzene, chlorine, n-paraffins. Product: alkylbenzene (36,000 mt/y).

Lingen-Ems. Feed: reformate, benzene-hydrogen, kerosine. Products: benzene (72,000 mt/y), cyclohexane (100,000 mt/y), normal paraffins (30,000 mt/y).

Mannheim. Feed: pyrolsis-gasoline, reformate. Products: benzene (270,000 mt/y), xylene mix (105,000 mt/y).

GREECE

DOW CHEMICAL

Lavrion. Product: polystyrene.

EKO CHEMICALS CO. AE

Thessaloniki. Feed: naphtha, refinery cuts, vinyl chloride. Products: ammonia (118,000 mt/y), ethylene (15,000 mt/y), polyvinyl chloride (65,000 mt/y), solvents (45,000 mt/y).

ETHYL HELLAS CHEMICAL CO. SA

Diavata, Thessaloniki. Feed: chlorine, ethylene, methanol, sodium, lead. Products: ethyl chloride (10,500 mt/y), ethylene dichloride (41,500 mt/y), tetraethyl-tetramethyl lead (27,500 mt/y), methyl chloride (7,000 mt/y), vinyl chloride (20,500 mt/y).

HADJILUCAS SA

Halkis. Feed: methanol. Product: formaldehyde (20,000 mt/y).

HUNGARY

HUNGARIAN OIL AND GAS TRUST

Százhalombatta. Feed: pyrolysis gasoline, reformate, vac gas oil (FCC unit). Products: benzene (110,000 mt/y), maleic anhydride (10,000 mt/y), orthoxylene (15,000 mt/y), propylene (42,000 mt/y), toluene (110,000 mt/y), xylene mix (85,000 mt/y).

INDIA

ADARSH CHEMICALS & FERTILIZERS LTD.

Udhna, Gujarat. Feed: benzene. Product: maleic anhydride (3,000 mt/y).

AHMEDABAD MANUFACTURING & CALICO PRINTING CL

Baroda. Feed: dimethyl terephthalate, ethylene glycol. Product: polyester (7,968 mt/y).

ALKALI & CHEMICAL CORP. OF INDIA LTD.

Rishra, West Bengal. Feed: alcohol. Products: ethylene (12,000 mt/y), ld polyethylene (12,000 t/y).

BAKELITE HYLAM LTD.

Sanathnagar, Hyderabad. Feed: phenol, formaldehyde, styrene, maleic-phthalic anhydride, isophthalic acid, propylene glycol. Products: formaldehyde (3,000 mt/y), phenolic resins (1,800 mt/y), polyester resins (1,800 mt/y).

BONGAIGAON REFINERY & PETROCHEMICALS LTD.

Dhaligaon, Assam. Feed: 110-145°C cut naphtha TBP. Products: dimethyl terephthalate (45,000 mt/y), orthoxylene (6,000 mt/y), paraxylene (29,000 mt/y).

CHEMICALS & PLASTICS INDIA LTD.

Krishnagiri. Feed: molasses. Product: ethanol (12,000 mt/y).

Metturdam. Feed: chlorine, ethanol. Products: ethylene (18,700 mt/y), ethylene dichloride (37,000 mt/y), polyvinyl chloride (21,300 mt/y), vinyl chloride (22,000 mt/y).

COROMANDEL FERTILIZERS LTD.

(International Minerals & Chemicals Corp., Chevron Chemical Corp., E.I.D. Parry (India) Ltd.)

Visakhapatnam, Andhra Pradesh. Feed: naphtha. Products: ammonia (114,500 mt/y), urea (108,000 mt/y).

FERTILIZER CORP. OF INDIA LTD.

Gorakhpur, Uttar Pradesh. Feed: naphtha. Product: urea (285,000 mt/y).

Sindri, Bihar. Feed: fuel oil. Products: ammonia (297,000 mt/y), urea (330,000 mt/y).

FERTILIZERS AND CHEMICALS, TRAVANCORE LTD. (FACT) and FACT ENGINEERING AND DESIGN ORGANIZATION (FEDO)

Ambalamedu (near Cochin), Kerala. Feed: naphtha. Products: urea (1,000 mt/d).

GARWARE NYLONS LTD.

Pimpri, Poona. Feed: caprolactam, dimethyl terephthalate, ethylene glycol. Products: nylon 6 (4,830 mt/y), polyamide (360 mt/y), polyester (1,576 mt/y).

GUJARAT NARMADA VALLEY FERTILIZERS CL

Narmadanagar, Bharuch. Feed: fuel oil. Products: ammonia (1,350 mt/d), methanol (60 mt/d), urea (1,800 mt/d).

GUJARAT STATE FERTILIZERS CL

Fertilizernagar (near Baroda). Feed: benzene, fuel oil, naphtha, natural gas, urea. Products: ammonia (348,000 mt/y), caprolactam (20,000 mt/y), cyclohexane (22,500 mt/y), nylon 6 (4,000 mt/y), urea (367,200 mt/y).

HERDILLIA CHEMICALS LTD.

Thana, Bombay. Feed: benzene, propylene, orthoxylene, 2-ethyl hexanol. Products: acetone (11,430 mt/y), cumene (29,000 mt/y), phenol (19,050 mt/y), phthalic anhydride (8,600 mt/y), plasticizers (9,500 mt/y), solvents (2,400 mt/y), styrene (900 mt/y).

HINDUSTAN FERTILIZER CORP. LTD.

Barauni (Bihar). Feed: naphtha. Products: ammonia (600 mt/d), urea (1,000 mt/d).

Durgapur. Feed: naphtha. Products: ammonia (600 mt/d), urea (1,000 mt/d).

Haldia. Feed: fuel oil. Products: ammonia (600 mt/d), methanol (125 mt/d), urea (500 mt/d).

Namrup (Assam). Feed: natural gas. Products: ammonia (800 mt/d), urea (1,167 mt/d).

HINDUSTAN ORGANIC CHEMICALS LTD.

(Government of India enterprise)

Rasayani, Raigad. Products: acetic acid (1,330 mt/y), acetic anhydride (2,000 mt/y), aniline (12,000 mt/y), formaldehyde (15,000 mt/y).

ILAC LTD.

(100% Ahmedabad Mfg. & Calico Printing CL)

Bombay. Feed: acetylene. Product: polyvinyl chloride (25,000 mt/y), vinyl chloride (6,500 mt/y).

INDIAN EXPLOSIVES LTD.

Kanpur, Uttar Pradesh. Feed: naphtha. Products: ammonia (411,000 mt/y), urea (675,000 mt/y).

INDIAN FARMERS FERTILIZER COOPERATIVE

Kalol, Gujarat. Feed: natural gas. Products: ammonia (910 mt/d), urea (1,200 mt/d).

Phulpur, Uttar Pradesh. Feed: naphtha. Products: ammonia (900 mt/d), urea (1,500 mt/d).

INDIAN OIL CORP. LTD.

Jawaharnagar. Feed: reformate. Products: benzene (45,000 mt/y), toluene (16,000 mt/y).

INDIAN PETROCHEMICALS CORP. LTD.

Vadodara. Feed: naphtha. Products: acrylates (10,000 mt/y), acrylonitrile (24,000 mt/y), alkylbenzene (30,000 mt/y), benzene (23,600 mt/y), butadiene (22,000 mt/y), carbon black feedstock (17,900 mt/y), dimethyl terephthalate (30,000 mt/y), ethylene (130,000 mt/y), ethylene dichloride (100,000 mt/y), ethylene glycol (13,900 mt/y), ethylene oxide (5,000 mt/y), normal paraffins (25,000 mt/y), orthoxylene (23,500 mt/y), paraxylene (17,000 mt/y), polybutadiene rubber (20,000 mt/y), ld polyethylene (80,000 mt/y), polypropylene (30,000 mt/y), polyvinyl chloride (55,000 mt/y), propylene (81,300 mt/y), resins (5,000 mt/y), solvents (20,000 mt/y), vinyl chloride (57,300 m/ty).

MADRAS FERTILIZERS LTD.

Manali. Feed: naphtha. Products: ammonia (750 mt/d), urea (885 mt/d).

McDOWELL & CL

Visakhapatnam. Feed: benzene, molasses. Products: ethylene (3,300 mt/y), styrene (13,936 mt/y), polystyrene (10,156 mt/y).

MYSORE PETROCHEMCIALS LTD.

Raichur, Karnataka. Feed: orthoxylene. Product: phthalic anhydride (9,000 mt/y).

NAGARJUNA FERTILIZERS AND CHEMICALS LTD.

Kakinada. Feed: naphtha. Products: ammonia (900 mt/d), urea (1,500 mt/d).

NATIONAL FERTILIZERS LTD.

Bhatinda, Punjab. Feed: fuel oil, low sulfur heavy stock. Products: ammonia (297,000 mt/y), urea (511,000 mt/y).

Naya Nangal, Punjab. Feed: fuel oil, low sulfur heavy stock. Products: ammonia (297,000 mt/y), methanol (16,500 mt/y), urea (330,000 mt/y).

Panipat, Haryana. Feed: fuel oil, low sulfur heavy stock. Products: ammonia (297,000 mt/y), urea (511,500 mt/y).

NATIONAL ORGANIC CHEMICAL INDUSTRIES LTD.

Thane. Feed: naphtha. Products: acetone (14,000 mt/y), benzene (17,000 mt/y), butadiene (7,200 mt/y), butanol (6,000 mt/y), ethylene (63,000 mt/y), ethylene dichloride (50,000 mt/y), ethylene glycol-diethylene glycol (11,000 mt/y), ethylene oxide (14,000 mt/y), isopropanol (4,000 mt/y), oxoalcohols (10,000 mt/y), polyvinyl chloride (21,500 mt/y), propylene (37,000 mt/y), vinyl chloride (30,000 mt/y).

PHILLIPS CARBON BLACK LTD.

(owned by Phillips Petroleum, Duncan Bros. CL, and public)

Durgapur, West Bengal. Feed: heavy oil. Product: carbon black (40,000 mt/y).

POLYCHEM LTD.

Baroda. Feed: acrylonitrile, butadiene, styrene. Product: ABS (2,000 mt/y).

Bombay. Feed: benzene, ethylene. Products: divinyl benzene (150 mt/y), ethylbenzene (17,000 mt/y), ethylene (2,000 mt/y), polystyrene (16,000 mt/y), styrene (14,000 mt/y), toluene (700 mt/y).

Nira (Maharashtra). Feed: acetic acid, ethanol, molasses, oxygen. Product: ethanol (7,270 mt/y), ethylene (4,000 mt/y), vinyl acetate monomer (10,000 mt/y).

POLYOLEFINS INDUSTRIES LTD. (PIL).

Thana, Maharashtra. Feed: ethylene. Product: hd polyethylene (44,000 mt/y).

RASHTRIYA CHEMICALS & FERTILIZERS LTD.

Trombay, Bombay. Feed: associated gas. Products: ammonia (90,000 mt/y), methanol (37,000 mt/y).

SHRI AMBUJA PETROCHEMICALS LTD.

Patancheru, Medak District. Feed: orthoxylene. Product: phthalic anhydride (8,600 mt/y).

SHRIRAM FERTILIZERS AND CHEMICALS

Kota, Rajasthan. Feed: naphtha. Products: ammonia (200,000 mt/y), urea (330,000 mt/y).

SOUTHERN PETROCHEMICAL INDUSTRIES CORP. LTD.

Tuticorin, Tamil Nadu. Feed: naphtha. Products: ammonia (352,000 mt/y), urea (512,000 mt/y).

SYNTHETICS AND CHEMICALS LTD.

(with Kilachand Devchand & Co. and Firestone Tire & Rubber Co.)

Bareilly, Uttar Pradesh. Feed: benzene, ethanol, petrobutadiene. Products: acetaldehyde (22,000 mt/y), butadiene (25,200 mt/y), ethylene (4,000 mt/y), styrene (11,250 mt/y), NBR (2,000 mt/y), SBR (33,000 mt/y).

THIRUMALAI CHEMICALS LTD.

Ranipet (T.N.). Feed: orthoxylene. Product: phthalic anhydride (7,500 mt/y).

UNION CARBIDE INDIA LTD.

Bombay. Feed: alcohol, naphtha. Products: acetaldehyde (11,000 mt/y), acetic acid (2,000 mt/y), acetylene (900 mt/y), aromatics mix (5,400 mt/y), benzene (2,800 mt/y), butanol (4,200 mt/y), ethylene (22,450 mt/y), polyethylene (20,425 mt/y), propylene (5,500 mt/y), toluene (2,000 mt/y), solvents (6,000 mt/y).

UNITED CARBON INDIA LTD.

Thane. Feed: lube extracts, naphtha cracker bottoms. Product: carbon black (35,700 mt/y).

ZUARI AGRO CHEMICALS LTD.

(Birla Gwalior Pvt. Ltd., U.S. Steel Corp., and public interests)

Zuarinagar. Feed: naphtha. Products: ammonia (220,000 mt/y), urea (340,000 mt/y).

INDONESIA

PERTAMINA

(state oil company)

Plaju, South Sumatra. Feed: propylene. Product: polypropylene (20,000 mt/y).

Rantau, North Sumatra. Feed: natural gas. Product: carbon black (5,000 mt/y).

PERUM PETROKIMIA GRESIK.
Gresik, Surabaya. Feed: fuel oil. Products: ammonia (3,600 mt/y), urea (45,000 mt/y).

P. T. PUSRI
Palembang, South Sumatra. Feed: natural gas. Product: urea (480,000 mt/y).

P. T. PUPUK KUJANG
Cikampek, Java. Feed: natural gas. Products: ammonia (330,000 mt/y), urea (570,000 mt/y).

IRELAND

NITRIGIN EIREANN TEORANTA
Marino Point, Cork. Feed: natural gas. Products: ammonia (435,000 mt/y), urea (330,000 mt/y).

ISRAEL

ELECTROCHEMICAL INDUSTRIES (FRUTAROM) LTD.
Near Akko. Feed: ethylene. Products: ethylene dichloride (35,000 mt/y), polyvinyl chloride (97,000 mt/y), vinyl chloride (100,000 mt/y).

FERTILIZERS & CHEMICALS LTD.
Haifa. Feed: LP-gas, naphtha, Bunker C. Products: ammonia (80,000 mt/y), urea (32,000 mt/y).

GADOT PETROCHEMICAL INDUSTRIES LTD.
Haifa Bay. Feed: aromatic rich streams. Products: aromatics mix (180,000 mt/y), benzene (60,000 mt/y), orthoxylene (15,000 mt/y), paraxylene (20,000 mt/y), phthalic anhydride (12,000 mt/y), solvents (40,000 mt/y), toluene (60,000 mt/y), xylene mix (60,000 mt/y).

ISRAEL PETROCHEMICAL ENTERPRISES LTD.
Haifa. Feed: refinery gases, LPG, naphtha. Products: carbon black (14,000 mt/y), ethylene (24,000 mt/y), ld polyethylene (100,000 mt/y), polystyrene (16,000 mt/y).

ITALY

ANIC
Gela. Feed: naphtha, natural gas. Products: acrylonitrile (90,000 mt/y), ammonia (220,000 mt/y), aromatics (150,000 mt/y), benzene (80,000 mt/y), butadiene (40,000 mt/y), ethylene (310,000 mt/y), ethylene dichloride (125,000 mt/y), ethylene glycol (46,000 mt/y), ethylene oxide (40,000 mt/y), ld polyethylene (90,000 mt/y), hd polyethylene (40,000 mt/y), polypropylene (50,000 mt/y), propylene (160,000 mt/y), toluene (90,000 mt/y), urea (200,000 mt/y), xylene mix (80,000 mt/y).
Manfredonia. Feed: natural gas. Products: ammonia (360,000 mt/y), urea (630,000 mt/y).
Pisticci. Feed: natural gas. Products: acrylic esters (7,000 mt/y), methanol (65,000 mt/y).
Ragusa. Feed: ethylene. Product: ld polyethylene (140,000 mt/y).
Ravenna. Feed: natural gas. Products: acetic acid (30,000 mt/y), acetylene (60,000 mt/y), ammonia (310,000 mt/y), butadiene (100,000 mt/y), isoprene (30,000 mt/y), polybutadiene (45,000 mt/y), polyisoprene (30,000 mt/y), polyvinyl acetate (25,000 mt/y), styrene (41,000 mt/y), urea (70,000 mt/y), vinyl acetate (30,000 mt/y), ABS (40,000 mt/y), SBR (150,000 mt/y), SBR latex (30,000 mt/y), nitrile (8,000 mt/y), solvents (100,000 mt/y).

AQUILA SpA
Trieste. Feed: catalytic reformate. Products: benzene (10,000 mt/y), toluene (32,500 mt/y), xylene mix (17,000 mt/y).

ASHLAND CHEMICAL ITALIANA SpA
Milan. Products: acrylics (1,000 mt/y), alkyds (8,000 mt/y).

CABOT ITALIANA SpA
(subsidiary of Cabot Corp., Boston, Mass.)
Ravenna. Feed: petroleum fractions, aromatic tar. Product: carbon black (75,000 mt/y).

CHIMICA DEL FRIULI
(Snia Viscosa group)
Torviscosa (Udine). Product: caprolactam (20,000 mt/y).

CHIMICA DEL TIRSO
(50% Anic, 50% Montefibre)
Ottana (Sardinia). Feed: paraxylene. Product: terephthalic acid (80,000 mt/y).

CHIMICA DI COLLEFERRO SpA
(Snia Viscosa group)
Colleferro. Product: polyester (40,000 mt/y).

COLUMBIAN CARBON EUROPA SpA
Trecate. Feed: heavy aromatic hydrocarbons. Product: furnace carbon black (43,000 mt/y).

DISTILLERIE ITALIANE
(divisione della Alusuisse Italia)
San Giovanni Valdarno (Arezzo). Products: acrylics (2,500 mt/y), polyester (10,000 mt/y), solvents (14,000 mt/y), plasticizers (64,000 mt/y).

DOW CHEMICAL SpA
Livorno. Products: polystyrene, SB-latex.

DUTRAL
(Montedison Group)
Ferrara. Product: EPR (60,000 mt/y).

FAR—Fabrica Adesivi Resine
Filago, Bergamo District. Products: formaldehyde (100,000 mt/y), acrylics (20,000 mt/y).

FERTIMONT SpA
(Montedison Group)
Ferrara. Feed: natural gas. Products: ammonia (450,000 mt/y), urea (500,000 mt/y).
Priolo. Feed: natural gas. Products: ammonia (300,000 mt/y), urea (190,000 mt/y).
San Giuseppe di Cairo. Feed: natural gas. Products: ammonia (165,000 mt/y), urea (180,000 mt/y).

FTALITAL
(divisione della Alusuisse Italia)
Scanzorosciate (Bergamo). Feed: benzene, butane, naphthalene, orthoxylene. Products: maleic anhydride (38,000 mt/y), phthalic anhydride (80,000 mt/y).

ICAM
(100% Anic)
Priolo. Feed: naphtha, gas oil. Products: ethylene (600,000 mt/y), propylene.

HIMONT ITALIA
Brindisi. Feed: propylene. Product: polypropylene (130,000 mt/y).
Ferrara. Feed: propylene. Product: polypropylene (85,000 mt/y).
Terni. Feed: propylene. Product: polypropylene (150,000).

INDUSTRIA ITALIANA PETROLI SpA
Rho. Feed: crude oil. Products: benzene (14,400 mt/y), toluene (24,000 mt/y), xylene mix (8,600 mt/y).

MOBIL CHIMICA ITALIANA
Naples. Feed: light naphtha, hp reformate. Products: benzene (76,000 mt/y), cyclohexane (40,000 mt/y), orthoxylene (63,000 mt/y), paraxylene (66,000 mt/y), toluene (50,000 mt/y), xylene mix (52,000 mt/y).

MONTEDIPE
(Montedison Group)
Ferrara. Product: polyester (6,500 mt/y).
Mantova. Products: acetone (130,000 mt/y), ethylbenzene (350,000 mt/y), ethylene dichloride (200,000 mt/y), maleic anhydride (11,000 mt/y), phenol (215,000 mt/y), polystyrene (255,000 mt/y), styrene (350,000 mt/y).
Porto Marghera. Products: acetic acid (65,000 mt/y), acetylene (40,000 mt/y), caprolactam (100,000 mt/y), ethylene (350,000 mt/y), propylene (180,000 mt/y), vinyl acetate (55,000 mt/y).
Priolo. Products: acetaldehyde (140,000 mt/y), ethylene dichloride (190,000 mt/y), ethylene oxide (15,000 mt/y), propylene glycol (13,000 mt/y), propylene oxide (40,000 mt/y).

PHILLIPS CARBON BLACK ITALIANA SpA
(owned by Phillips Petroleum and Anic SpA)
Ravenna. Feed: aromatic oils. Product: carbon black (69,000 mt/y).

RESEM
(Montedison Group)
Castellanza. Feed: methane. Products: formaldehyde (400,000 mt/y), melamine (26,000 mt/y), methanol (120,000 mt/y), urea (100,000 mt/y).

SARAS CHIMICA
(60% Anic, 20% Saras, 20% Montedison)
Sarroch (Sardinia). Feed: refinery feedstock. Products: cumene (200,000 mt/y), ethylbenzene (40,000 mt/y), n-paraffins (160,000 mt/y), orthoxylene (80,000 mt/y), paraxylene (80,000 mt/y).

SARPOM
Trecate (Novara). Feed: intermediate and heavy virgin naphtha. Products: aromatics mix (18,000 mt/y), cyclohexane (3,000 mt/y), normal paraffins (69,000 mt/y).

SAVITRI SRL
(100% Himont Italia SpA)
Gela. Feed: propylene. Product: polypropylene (65,000 mt/y).

SELM-Societa Energia Montedison
(Montedison Group)
Priolo. Feed: naphtha, pyrolysis gasoline, propylene. Products: benzene (350,000 mt/y), cumene (270,000 mt/y), ethylbenzene (70,000 mt/y), orthoxylene (75,000 mt/y), paraxylene (130,000 mt/y), toluene (200,000 mt/y).

SOCIETA CHIMICA DAUNA
(50% Snia Viscosa, 50% Anic)
Manfredonia, Foggia. Feed: toluene. Product: caprolactam (80,000 t/y).

SOCIETA CHIMICA RAVENNA
Ravenna. Products: polyvinyl chloride (140,000 mt/y), vinyl chloride (154,000 mt/y).

SOLVAY & CIE. SA
Ferrara. Feed: vinyl chloride monomer. Products: polyvinyl chloride.
Rosignano. Feed: methane, natural gas. Product: hd polyethylene.

TECNOPOLIMERI SpA
(Snia Viscosa group)
Ceriano Laghetto (Milan). Feed: caprolactam, PA66. Product: polyamide (27,000 mt/y).

TERNI INDUSTRIE CHIMICHE SpA
Nera Montoro (Terni). Feed: natural gas. Products: ammonia (120,000 mt/y), urea (100,000 mt/y).

VEDRIL
(Montedison Group)
Rho. Feed: ACH. Product: acrylics (48,000 mt/y).

VINAVIL SpA
(Montedison Group)
Porto Maarghera. Product: polyvinyl acetate (38,000 mt/y).
Villadossola. Products: acrylics (11,000 mt/y), polyvinyl alcohol (2,000 mt/y), polyvinyl acetate (61,000 mt/y), polyvinyl acetate-ethylene (25,000 mt/y).

JAPAN

A. G. INTERNATIONAL CHEMICAL CL
(subsidiary of Mitsubishi Gas Chemical Cl)
Mizushima. Feed: m-xylene. Product: isophthalic acid (35,000 mt/y).

ASAHI CHEMICAL INDUSTRY CL

Kawasaki. Products: acrylic esters (20,000 mt/y), acrylonitrile (89,760 mt/y), acrylics (26,950 mt/y), polystyrene (55,200 mt/y), styrene (65,000 mt/y), BR-SBR rubber (129,000 mt/y).

Mizushima. Products: acrylonitrile (128,700 mt/y), ammonia (264,000 mt/y), hd polyethylene (197,300 mt/y), polystyrene (145,000 mt/y), styrene (330,000 mt/y), ABS (48,000 mt/y).

Nobeoka. Product: nylon 66 (15,000 mt/y).

ASAHI GLASS CL

Chiba. Feed: chlorine, natural gas, propylene. Products: ammonia (46,000 mt/y), propylene glycol (14,000 mt/y), propylene oxide (26,000 mt/y).

Kashima. Feed: chlorine, propylene. Products: propylene glycol (26,000 mt/y), propylene oxide (60,000 mt/y).

ASIA OIL CL

Yokohama. Feed: refinery streams. Product: benzene (100,000 mt/y).

CHIBA BUTADIENE INDUSTRY CL

(joint venture of Maruzen Petrochemical Co. and Ube Kosan Co.)

Goi-minamikaigan, Chiba. Feed: C_4. Product: butadiene (75,000 mt/y).

CHIBA VCM CL

Chiba. Feed: ethylene, ethylene dichloride. Product: vinyl chloride (160,000 mt/y).

CHISSO CORP.

Minamata and Mizushima. Feed: acetic acid, ethylene, vinyl chloride monomer. Products: acetic anhydride (5,200 mt/y), polyvinyl chloride (76,000 mt/y).

CHISSO PETROCHEMICAL CORP.

Goi. Feed: ethylene, propylene. Products: oxoalcohols (50,000 mt/y), hd polyethylene (45,000 mt/y), polypropylene (155,000 mt/y), polyvinyl chloride (46,000 mt/y), solvents (44,000 mt/y), plasticizers (48,000 mt/y).

DAICEL CHEMICAL INDUSTRIES LTD.

Aboshi. Feed: acetic acid, methanol. Products: acetic acid (225,000 mt/y), acetic anhydride (120,000 mt/y).

Fuji, Shizuoka. Feed: methanol. Product: formaldehyde (190,000 mt/y).

Ohtake, Hiroshima. Feed: acetaldehyde, naphtha, propylene. Products: acetic acid (36,000 mt/y), solvents (50,000 mt/y), plasticizers (10,000 mt/y).

DAINIPPON INK & CHEMICALS INC.

Amagasaki, Chiba, Sakai, Yokkaichi. Feed: purchased. Products: alkyds (49,000 mt/y), butylenes (18,000 mt/y), formaldehyde (18,000 mt/y), polyamide (3,000 mt/y), polyester (62,000 mt/y), polystyrene (70,500 mt/y), SBR (6,000 mt/y).

DENKI KAGAKU KOGYO KABUSHIKI KAISHA

Goi, Chiba Prefecture. Feed: acetic acid, benzene, ethylene, vinyl chloride. Products: ABS (40,000 mt/y), ethylbenzene (185,000 mt/y), polystyrene (113,500 mt/y), polyvinyl chloride (65,000 mt/y), styrene (160,000 mt/y), vinyl acetate (66,000 mt/y).

Omi, Niigata Prefecture. Feed: acetic acid, carbide-acetylene, chlorine. Products: polyvinyl alcohol (28,800 mt/y), polyvinyl chloride (53,500 mt/y), vinyl acetate (60,000 mt/y), vinyl chloride (42,000 mt/y).

FUJI OIL CL

Sodegaura, Chiba. Feed: naphtha. Product: n-paraffins (15,000 mt/y).

GENERAL PETROCHEMICAL INDUSTRIES LTD.

Sakai. Feed: naphtha. Products: benzene (30,000 mt/y), toluene (120,000 mt/y), xylene mix (150,000 mt/y).

mt/y)

IDEMITSU PETROCHEMICAL CL

Chiba. Feed: naphtha. Products: benzene (150,000 mt/y), paraxylene (130,000 mt/y), hd polyethylene (82,000 mt/y), polypropylene (80,000 mt/y), polystyrene (30,000 mt/y), styrene (160,000 mt/y).

Tokuyama. Feed: naphtha. Products: benzene (180,000 mt/y), cyclohexane (90,000 mt/y), ethylene (380,000 mt/y), polystyrene (60,000 mt/y), propylene (220,000 mt/y), styrene (91,000 mt/y—joint ownership with Nippon Zeon), toluene (74,000 mt/y), xylene mix (102,000 mt/y).

JAPAN ALDEHYDE CL

Chiba. Feed: ethylene. Product: acetaldehyde (60,000 mt/y).

JAPAN BUTYL CL

Kawasaki. Feed: isobutylene, isoprene. Product: butyl rubber (63,000 mt/y).

JAPAN ETHANOL CL

Yokkaichi. Feed: ethylene. Product: ethanol (40,000 mt/y).

JAPAN LACTAM CL

Niihama. Feed: cyclohexene, hydroxylamine. Product: caprolactam (72,000 mt/y).

JAPAN PHENOL CL

Kashima. Feed: cumene. Products: acetone (60,000 mt/y), phenol (100,000 mt/y).

JAPAN PHTHALIC CL

(subsidiary of Mitsubishi Gas Chemical CI)

Mizushima. Feed: o-xylene. Product: phthalic anhydride (75,000 mt/y).

JAPAN SYNTHETIC ALCOHOL CL

Kawasaki. Feed: ethylene. Product: ethanol (40,000 mt/y).

JAPAN SYNTHETIC RUBBER CL

Chiba. Feed: butadiene. Products: polybutadiene resins (10,000 mt/y), rubber (50,000 mt/y).

Kashima. Feed: C_4-C_5 streams. Products: butadiene (50,000 mt/y), isoprene (30,000 mt/y), polyisoprene (30,000 mt/y).

Yokkaichi. Feed: acrylonitrile, C_4 stream, ethylene, propylene, styrene. Products: butadiene (95,000 mt/y), ABS (72,000 mt/y), AES (10,000 mt/y), polybutadiene (25,000 mt/y), EPR (30,000 mt/y), SB latex (55,000 mt/y), SBR, HSR, NBR (255,000 mt/y).

KASHIMA VINYL CHLORIDE MONOMER CL

Kashima. Feed: ethylene. Product: vinyl chloride (270,000 mt/y).

KAWASAKI KASEI CHEMICALS LTD.

Kawasaki. Feed: crude naphthalene, orthoxylene, oxoalcohols, phthalic anhydride. Products: naphthalene (12,000 mt/y), phthalic annydride (72,000 mt/y), plasticizers (57,000 mt/y).

KURARAY CL

Okayama. Feed: ethylene, terephthalic acid. Products: vinyl acetate (162,000 mt/y), polyvinyl alcohol (225 mt/d).

Nakajo. Product: polyvinyl alcohol (120 mt/d).

Saijo. Product: polyester (77.8 mt/d).

Tamashima. Product: polyester (121 mt/d).

KURARAY-ISOPRENE CHEMICAL CL

Kashima. Feed: butene, butane. Products: isoprene (30,000 mt/y), polyisoprene (30,000 mt/y).

KURARAY YUKA CL

Yokkaichi City. Feed: paraxylene. Product: terephthalic acid (53,000 mt/y).

KYODO SAKUSAN CL

(subsidiary of Daicel Chemical Industries Ltd.)

Aboshi, Himeji, Hyogo. Feed: methanol. Product: acetic acid (225,000 mt/y).

KYOWA YUKA CL

Yokkaichi. Feed: ethylene, propylene. Products: acetaldehyde (125,000 mt/y), acetone (36,000 mt/y), butanol (60,000 mt/y), butyraldehyde (180,000 mt/y), oxoalcohols (100,000 mt/y).

MARUZEN OIL CL

Matsuyama. Feed: naphtha. Products: benzene (7,000 mt/y), toluene (25,000 mt/y), xylene mix (50,000 mt/y), solvents (50,000 mt/y).

MARUZEN PETROCHEMICAL CL

Ichihara, Chiba. Feed: naphtha. Products: benzene (161,000 mt/y), butadiene (55,000 mt/y), ethylene (373,000 mt/y), propylene (220,000 mt/y), toluene (96,000 mt/y), xylene mix (68,000 mt/y).

MITSUBISHI CHEMICAL INDUSTRIES LTD.

Kurosaki. Feed: coal, naphtha. Products: ammonia (264,000 mt/y), caprolactam (84,000 mt/y), carbon black (36,000 mt/y), dimethyl terephthalate (60,000 mt/y), nylons (12,000 mt/y), terephthalic acid (230,000 mt/y), urea (264,000 mt/y).

Mizushima. Feed: naphtha, LPG. Products: acetaldehyde (120,000 mt/y), acetone (55,000 mt/y), acrylonitrile (112,000 mt/y), alphaolefins (25,000 mt/y), ammonia (87,800 mt/y), benzene (200,000 mt/y), butanol (25,000 mt/y), cyclohexane (100,000 mt/y), ethylene (360,000 mt/y), maleic anhydride (18,000 mt/y), oxoalcohols (146,000 mt/y), orthoxylene (27,000 mt/y), paraxylene (43,000 mt/y), ld polyethylene (86,000 mt/y), hd polyethylene (69,000 mt/y), polypropylene (26,000 mt/y), propylene (216,000 mt/y), toluene (60,000 mt/y), xylene mix (30,000 mt/y).

Yokkaichi. Feed: butadiene, styrene. Products: carbon black (84,000 mt/y), SBR (65,000 mt/y).

MITSUBISHI GAS CHEMICAL CI

Mizushima. Feed: mixed xylene. Products: ethylbenzene (60,000 mt/y), maleic anhydride (3,700 mt/y), metaxylene (30,000 mt/y), orthoxylene (90,000 mt/y), paraxylene (120,000 mt/y), xylene mix (240,000 mt/y).

Niigata. Feed: natural gas. Products: ammonia (211,200 mt/y), formaldehyde (220,000 mt/y), methanol (396,000 mt/y), urea (198,000 mt/y).

MITSUBISHI MONSANTO CHEMICAL CO.

Yokkaichi. Feed: acrylonitrile, styrene, SBR. Products: ABS (54,000 mt/y), polystyrene (130,000 mt/y).

MITSUBISHI PETROCHEMICAL CL

Kashima. Feed: naphtha. Products: benzene (175,000 mt/y), cumene (140,000 mt/y), ethylene (324,500 mt/y), ethylene glycol (68,000 mt/y), ethylene oxide (66,000 mt/y), oxoalcohols (30,000 mt/y), ld polyethylene (60,000 mt/y), lld polyethylene (75,000 mt/y), polypropylene (120,000 mt/y), styrene (241,000 mt/y).

Yokkaichi. Feed: naphtha. Products: acrylic acid (28,500 mt/y), alkylbenzene (65,000 mt/y), benzene (221,000 mt/y), ethylene (227,100 mt/y), ethylene glycol (86,000 mt/y), ethylene oxide (80,000 mt/y), oxoalcohols (30,000 mt/y), ld polyethylene (13,000 mt/y), polypropylene (70,000 mt/y), styrene (241,000 mt/y), toluene (48,000 mt/y), xylene (13,000 mt/y).

MITSUBISHI YUKA BADISCHE CL

(joint venture of BASF and Mitsubishi Petrochemical CL)

Yokkaichi. Feed: styrene. Products: expandable polystyrene (59,000 mt/y).

MITSUI DU PONT POLYCHEMICALS

(50% Mitsui Petrochemical Ind. Ltd., 50% E.I. du Pont de Nemours & Co.)

Chiba. Feed: ethylene. Product: ld polyethylene (100,000 mt/y).

Ohtake. Feed: ethylene. Product: ld polyethylene (50,000 mt/y).

MITSUI PETROCHEMICAL INDUSTRIES LTD.

Chiba. Feed: naphtha. Products: acetone (108,000 mt/y), aniline (30,000 mt/y), benzene (93,000 mt/y), butanol (53,000 mt/y), butylenes (22,000 mt/y), ethylene glycol (109,000 mt/y), ethylene oxide (109,000 mt/y), phenol (180,000 mt/y), hd polyethylene (170,000 mt/y), polypropylene

(120,000 mt/y), resins (20,000 mt/y), toluene (54,000 mt/y), xylene mix (44,000 mt/y), ethylene-propylene rubber (30,000 mt/y).

Iwakuni-Ohtake. Feed: naphtha. Products: acetaldehyde (36,000 mt/y), acetone (36,000 mt/y), benzene (62,000 mt/y), ethylene (92,000 mt/y), phenol (30,000 mt/y), hd polyethylene (54,000 mt/y), md polyethylene (45,000 mt/y), propylene (69,000 mt/y), resins (34,000 mt/y), solvents (9,100 mt/y), terephthalic acid (150,000 mt/y), crude terephthalic acid (320,000 mt/y), toluene (46,000 mt/y), xylene mix (39,000 mt/y)

MIZUSHIMA AROMA CL
(subsidiary of Mitsubishi Gas Chemical Cl).

Mizushima. Feed: paraxylene. Products: terephthalic acid (115,000 mt/y).

MIZUSHIMA ETHYLENE KK
(50% Mitsubishi Chemical Industries, 50% Sanyo Petrochemicals).

Mizushima. Feed: LPG, naphtha. Products: ethylene (360,000 mt/y), propylene (216,000 mt/y).

NIHON ALKYLATE CL
(Sumitomo Chemical Co. and Kao Soap Co.).

Niihama. Feed: benzene. Product: linear alkylbenzene (31,500 mt/y).

NIHON OXIRANE CL
(Atlantic Richfield, Sumitomo Chemical, Showa Denko).

Chiba. Feed: ethylbenzene, propylene. Products: propylene oxide (90,000 mt/y), styrene (225,000 mt/y).

NIHON POLYSTYRENE CL
Kawasaki. Feed: styrene. Product: polystyrene (58,000 mt/y).

NIHON VINYL CHLORIDE CL
(Sumitomo Chemical Co., Denki Kagaku Kogyo KK).

Chiba. Feed: chlorine, ethylene. Product: ethylene dichloride (80,000 mt/y).

NIPPON CARBIDE INDUSTRIES CI
Toyama. Feed: vinyl chloride monomer. Product: acrylics, polyvinyl chloride (1,500 mt/y).

NIPPON KASEI CHEMICAL CL
Onahama, Fukushima. Feed: creosote oil, methanol. Products: carbon black (28,000 mt/y), formaldehyde (96,000 mt/y).

NIPPON MINING CL
Mizushima. Feed: kerosine, gas-oil. Product: n-paraffins (77,000 mt/y).

NIPPON OIL AND FATS CO.
Oita. Feed: C_4 cut, C_4 LPG. Products: isoparaffins (1,200 mt/y), maleic anhydride (12,000 mt/y), polybutene (8,000 mt/y).

NIPPON PETROCHEMICALS CL
Kawasaki and Ukishima. Feed: LPG, naphtha. Products: acetone (26,000 mt/y), benzene (72,000 mt/y), butadiene (50,000 mt/y), ethylene (189,000 mt/y), isopropanol (60,000 mt/y), n-paraffins (55,000 mt/y), ld polyethylene (147,000 mt/y), polyisobutylene (2,000 mt/y), propylene (148,000 mt/y), toluene (42,000 mt/y), xylene (34,000 mt/y).

NIPPON PETROLEUM DETERGENT CL
(45% Chevron Chemical Co., 55% Nippon Petrochemicals Co.)

Kawasaki. Feed: n-paraffin, propylene, benzene. Product: alkylbenzene (85,000 t/y).

NIPPON POLYURETHANE INDUSTRIAL CL
Shin-Nanyo, Yamaguchi. Product: polyester (7,200 t/y).

NIPPON SHOKUBAI KAGAKU KOGYO CL
Himeji. Feed: benzene, naphthalene, orthoxylene, propylene. Products: acrylic acid-acrylic esters (60,000 mt/y), maleic anhydride (36,000 mt/y), phthalic anhydride (80,000 mt/y).

Kawasaki. Feed: ethylene. Products: ethylene glycol (185,000 mt/y), ethylene oxide (185,000 mt/y).

Suita. Feed: ethylene glycols, phthalic anhydride, styrene. Product: alkyds, polyester (48,000 mt/y).

NIPPON ZEON CL
Kawasaki. Feed: acrylonitrile, butadiene, styrene. Products: NBR (30,000 mt/y), SBR (30,000 mt/y).

Mizushima. Feed: vinyl chloride. Product: polyvinyl chloride (130,000 mt/y).

Takaoka. Feed: vinyl chloride. Product: polyvinyl chloride (80,000 mt/y).

Tokuyama. Feed: C_4 stream. Products: butadiene (140,000 mt/y), polybutylene (48,000 mt/y), EBR (10,000 mt/y), SBR-NBR-HS (190,000 mt/y)

NISSAN CHEMICAL INDUSTRIES LTD.
Toyama. Feed: LPG, naphtha. Products: ammonia (165,000 mt/y), melamine (42,000 mt/y), urea (214,000 mt/y).

NISSAN NALKEN CORP.
Chiba, Pref. Feed: benzene, n-paraffin. Product: alkylbenzene (40,000 mt/y).

NISSAN MARUZEN POLYETHYLENE CL
Goi, Chiba. Feed: ethylene. Product: hd polyethylene (70,000 mt/y).

NISSAN PETROCHEMICAL LTD.
Goi, Chiba. Feed: ethylene, olefins, propylene. Products: oxoalcohols (80,000 mt/y), polyvinyl chloride (50,000 mt/y), vinyl chloride (60,000 mt/y).

NISSO PETROCHEMICAL INDUSTRIES CL.
Chiba. Feed: ethylene, propylene. Products: ethylene glycol (70,000 mt/y), ethylene oxide (70,000 mt/y), propylene glycol (22,000 mt/y).

Yokkaichi. Feed: ethylene. Products: ethylene glycol (60,000 mt/y), ethylene oxide (60,000 mt/y).

NITTETSU CHEMICAL INDUSTRIAL CL
Tobata. Feed: coal tar pitch, heavy oil. Product: carbon black (48,000 mt/y).

OKAYAMA BUTADIENE CL
(Joint venture of Nippon Zeon CL and Asahi Chemical Industry CL).

Mizushima. Feed: C_4 steam. Product: butadiene (140,000 mt/y).

OSAKA GAS CL
Osaka. Feed: coke oven gas oil. Products: benzene (80,000 mt/y), naphthalene (11,000 mt/y), toluene (10,000 mt/y).

OSAKA PETROCHEMICAL INDUSTRIES LTD.
Takaishi, Osaka. Feed: LPG, naphtha. Products: aromatics (225,000 mt/y), benz~~ene (1~~00,000 mt/y), butadiene (50,000 mt/y), ethylene (300,000 mt/y), propylene (200,000 mt/y).

SANYO ETHYLENE CL
Mizushima. Feed: naphtha. Products: ethylene (390,000 mt/y), propylene (254,000 mt/y).

SANYO MONOMER CL
(joint venture of Nippon Zeon CL, Asahi Chemical Co., Chisso Corp.)

Mizushima. Feed: ethylene, chlorine. Products: vinyl chloride (175,000 mt/y).

SEITETSU KAGAKU CL
Befu. Products: formaldehyde (32,400 mt/y).

Himeji. Products: formaldehyde (107,000 mt/y), methanol (165,000 mt/y).

SHIN-DAIKYOWA PETROCHEMICAL CL
(Daikyo Oil CL, Toyo Soda Mfg. CL, Kyowa Hakko Kogyo CL, Dainippon Ink and Chemicals Inc., Industrial Bank of Japan).

Yokkaichi. Feed: naphtha. Products: benzene (66,000 mt/y), butylenes (122,900 mt/y), cumene (140,000 mt/y), ethylene (361,300 mt/y), ethylbenzene (142,000 mt/y), hd polyethylene (63,000 mt/y), propylene (220,300 mt/y), styrene (90,000 mt/y), toluene (60,000 mt/y), xylene mix (43,000 mt/y).

SHIN-ETSU CHEMICAL CL
Kashima. Feed: vinyl chloride. Product: polyvinyl chloride (198,000 mt/y).

Shin-Nanyo. Feed: vinyl chloride. Product: polyvinyl chloride (42,000 mt/y).

SHIN-ETSU VINYL ACETATES CL
Sakai. Feed: acetic acid, ethylene. Product: vinyl acetate (80,000 mt/y).

SHOWA ACETYL CHEMICAL CL
Ohita. Feed: ethylene. Products: acetaldehyde (130,000 mt/y), acetic acid (150,000 mt/y), vinyl acetate (80,000 mt/y).

SHOWA DENKO KK
Kawasaki. Feed: propylene. Products: acrylonitrile (52,000 mt/y), propylene glycol (18,000 mt/y), propylene oxide (35,000 mt/y).

Oita. Feed: naphtha. Products: aromatics (160,000 mt/y), butadiene (45,000 mt/y), ethylene (320,000 mt/y), ld polyethylene (95,000 mt/y), hd polyethylene (114,100 mt/y), polypropylene (91,600 mt/y), propylene (170,000 mt/y).

SHUNAN CHEMICAL CL
(Tokuyama Soda CL)

Tokuyama. Feed: ethylene, propylene. Products: ethylene dichloride (130,000 mt/y), propylene oxide (40,000 mt/y).

SUMITOMO CHEMICAL CL
Chiba. Feed: butane, naphtha. Products: benzene (100,000 mt/y), ethylene (345,000 mt/y), ld polyethylene (190,000 mt/y), polypropylene (138,000 mt/y), polyvinyl chloride (52,800 mt/y), propylene (259,000 mt/y), toluene (60,000 mt/y), xylene (40,000 mt/y), SBR (50,000 mt/y), ethylene-propylene rubber (25,000 mt/y).

Niihama. Feed: butane, naphtha. Products: acrylic acid-esters (32,000 mt/y), acrylonitrile (52,000 mt/y), ammonia (275,400 mt/y), cyclohexane (40,000 mt/y), polyvinyl chloride (26,700 mt/y).

SUN ARROW CHEMICAL CL
(Tokuyama Soda CL)

Tokuyama. Feed: ethylene dichloride. Products: polyvinyl chloride (85,000 mt/y), vinyl chloride (180,000 mt/y).

TAKEDA CHEMICAL INDUSTRIES LTD.
Kashima. Feed: benzene. Product: maleic anhydride (16,500 t/y).

Shimizu. Feed: butadiene, styrene maleic anhydride, propylene glycol. Products: polyester (27,500 mt/y), SBR (20,000 mt/y).

TEIJIN HERCULES CHEMICAL CL
Ehime. Feed: paraxylene. Product: dimethyl terephthalate (140,000 mt/y).

Matsuyama. Feed: paraxylene. Product: dimethyl terephthalate (60,000 mt/y).

Tokuyama. Feed: paraxylene. Product: dimethyl terephthalate (75,000 mt/y).

TEIJIN PETROCHEMICAL INDUSTRIES LTD.
Ehime. Feed: mixed xylenes. Products: orthoxylene (30,000 mt/y), paraxylene (170,000 mt/y).

Tokuyama. Feed: mixed xylene. Products: ethylbenzene (20,000 mt/y), orthoxylene (30,000 mt/y), paraxylene (35,000 mt/y).

TOHO RIKA KOGYO KK
Nagoya. Feed: methanol, orthoxylene. Product: formaldehyde (80,000 mt/y), phthalic anhydride (30,000 mt/y).

TOKUYAMA PETROCHEMICAL CL
Shin-Nanyo. Feed: ethylene. Products: acetaldehyde (100,000 mt/y).

TOKUYAMA SODA CL
Tokuyama. Feed: propylene. Products: isopropanol (36,000 mt/y), polypropylene (95,000 mt/y).

TOKUYAMA STYRENE MONOMER CL
(jointly owned by Idemitsu Petrochemical CL, and Nippon Zeon CL)
Tokuyama. Feed: benzene, ethylene. Product: styrene (91,000 mt/y).

TOMAKOMAI SODA CL
(Nippon Zeon, Hokkaido Soda, Maruzen Petrochemical, Nippon Light Metal, Nissho Iwai, Asahi Denka)
Tomakomai. Feed: ethylene. Product: ethylene dichloride (120,000 mt/y).

TONEN PETROCHEMICAL CL
Kawasaki. Feed: naphtha, LPG. Products: butadiene (105,000 mt/y), butanol (7,000 mt/y), ethylene (480,000 mt/y), oxoalcohols (30,000 mt/y), hd polyethylene (45,000), polypropylene (76,000 mt/y).
Wakayama. Feed: reformate. Products: benzene (40,000 mt/y), orthoxylene (65,000 mt/y), paraxylene (68,000 mt/y), toluene (80,000 mt/y).

TORAY INDUSTRIES INC.
Chiba. Feed: acrylonitrile, butadiene, styrene. Products: ABS (55,200 mt/y).
Kawasaki. Feed: benzene, toluene, xylene. Products: benzene (85,000 mt/y), cyclohexane (150,000 mt/y), orthoxylene (100,000 mt/y), paraxylene (200,000 mt/y), xylene mix (39,000 mt/y).
Nagoya. Feed: cyclohexane, paraxylene. Products: caprolactam (130,000 mt/y), nylon (26,400 mt/y), terephthalic acid (100,000 mt/y).

TOUBU BUTADIENE CL
(50% Japan Synthetic Rubber, 50% Sumitomo Chemical)
Chiba. C_4 streams. Product: butadiene (130,000 mt/y).

TOYO CONTINENTAL CARBON LTD.
(subsidiary of Witco Chemical Corp.)
Shimonoseki. Feed: heavy aromatic oils. Product: carbon black (15,000 mt/y).
Yokoshiba. Feed: heavy aromatic oils. Product: carbon black (45,000 mt/y).

TOYO SODA MANUFACTURING CL
Tokuyama. Feed: ethylene. Products: ammonia (57,000 mt/y), polyethylene (81,000 mt/y), polyvinyl chloride (12,500 mt/y) vinyl chloride (171,600 mt/y), rubber (20,000 mt/y).
Yokkaichi. Feed: ethylene. Products: polyethylene (86,000 mt/y), polyvinyl chloride (98,000 mt/y), vinyl chloride (127,400 mt/y).

UBE INDUSTRIES LTD.
Ichihara, Chiba. Feed: butadiene, ethylene. Products: polybutadiene (60,000 mt/y), ld polyethylene (101,000 mt/y).
Sakai, Osaka. Feed: benzene, LPG, LNG, naphtha, propylene. Products: ammonia (234,600 mt/y), caprolactam (90,000 mt/y), cyclohexane (100,000 mt/y), polypropylene (105,000 mt/y), urea (95,200 mt/y).
Ube, Yamaguchi. Feed: benzene. Products: caprolactam (90,000 mt/y), cyclohexane (58,000 mt/y), nylon 6 (24,600 mt/y), nylon 66 (2,400 mt/y), nylon 12 (2,400 mt/y).

UKISHIMA PETROCHEMICALS CL
(50% Nippon Petrochemicals CL, 50% Mitsui Petrochemical Industries)
Kawasaki. Feed: benzene, n-paraffin, propylene. Products: ethylene (496,000 mt/y), propylene (234,000 mt/y).

UNITIKA CHEMICAL CO.
Sakai. Feed: vinyl chloride. Product: polyvinyl alcohol (24,000 mt/y).

YUKA MELAMINE CL
Kashima. Feed: urea. Product: melamine (30,000 mt/y).

ZEON ISOPRENE CL
(Subsidiary of Nippon Zeon)
Mizushima. Feed: C_5 stream, isoprene. Products: isoprene (45,000 mt/y), polyisoprene (37,000 mt/y), C_5 resin.

JORDAN

INTERMEDIATES PETROCHEMICALS INDUSTRIES CL
Zarqa. Feed: glycols, maleic-phthalic anhydrides, oxoalcohols, polyvinyl chloride, styrene. Products: polyesters (8,000 mt/y), plasticizers (4,000 mt/y).

KOREA

DAINONG PETROCHEMICAL INDUSTRY CL
(joint venture Dainong CL, Mitsui Toatsu Chemicals Inc., Toyo Menka Kaisha Ltd.)
Ulsan. Feed: benzene. Product: maleic anydride (11,000 mt/y).

ESOO CHEMICAL CL
Ulsan. Feed: benzene, n-paraffin. Products: alkylbenzene (25,000 mt/y), linear alkylbenzene (30,000 mt/y).

HANKOOK CAPROLACTAM CORP.
Ulsan. Feed: cyclohexane. Product: caprolactam (40,000 mt/y).

HANNAM CHEMICAL CORP.
Ulsan. Feed: acrylonitrile, butadiene, styrene. Product: ABS (20,000 mt/y), polystyrene (135,000 mt/y).

HONAM ETHYLENE CL
Yeo-Chon. Feed: C_4, gas oil, LPG, naphtha. Products: benzene (74,000 mt/y), butadiene—as mixed C_4s (129,000 mt/y), ethylene (350,000 mt/y), propylene (187,000 mt/y), toluene (44,000 mt/y), xylene mix (30,000 mt/y).

KOLON PETROCHEMICAL CL.
Ulsan. Feed: heavy aromatic oil. Product: resins (15,000 mt/y).

KOREA FERTILIZER CL
Ulsan. Feed: naphtha. Products: ammonia (195,000 mt/y), melamine (6,000 mt/y), urea (330,000 mt/y).

KOREA PETROCHEMICAL INDUSTRIES CL
Ulsan. Feed: ethylene, propylene. Products: hd polyethylene (70,000 mt/y), polypropylene (120,000 mt/y).

KOREA PLASTIC INDUSTRY CORP.
Chinhae, Kunsan, Ulsan. Feed: vinyl chloride. Product: polyvinyl chloride (215,000 mt/y), plasticizers (20,000 mt/y).

KOREA POLYOL CL
Ulsan. Feed: propylene oxide. Product: polypropylene glycol (20,000 mt/y).

KOREA SYNTHETIC RUBBER INDUSTRY CL
Ulsan. Feed: butadiene, styrene. Product: SBR (120,000 mt/y).
Yeochun. Feed: C_4, butadiene. Products: butadiene (60,000 mt/y), polybutadiene (30,000 mt/y).

LUCKY CONTINENTAL CARBON CL
(subsidiary of Witco Chemical Corp.)
Bupyong. Feed: heavy aromatic oil. Product: carbon black (45,000 mt/y).
Yosu. Feed: heavy aromatic oil. Product: carbon black (45,000 mt/y) y).

LUCKY LTD.
Yeo-Chon. Products: ABS (75,000 mt/y), butanol (10,000 mt/y), oxoalcohols (55,000 mt/y), polyvinyl chloride (200,000 mt/y), plasticizers (36,000 mt/y).

NAMHAE CHEMICAL CORP.
Yosu, Chunnam. Feed: naphtha. Products: ammonia (1,814 mt/d), urea (2,000 mt/d).

SAM KYUNG CHEMICAL CL
Ulsan. Feed: orthoxylene, phthalic anhydride, 2-ethyl hexanol. Product: phthalic anhydride (38,400 mt/y), plasticizers (24,000 mt/y).

TONG SUH PETROCHEMICAL CORP. Ltd.
Ulsan. Feed: ammonia, propylene. Product: acrylonitrile (83,000 mt/y).

YONG-NAM CHEMICAL CL
Ulsan. Feed: naphtha. Product: ammonia (310 mt/d), urea (375 mt/d).

YUKONG LTD.
Ulsan. Feed: naphtha. Products: benzene (56,000 mt/y), butadiene (24,000 mt/y), cyclohexane (38,000 mt/y), ethylene (155,000 mt/y), propylene (81,000 mt/y), toluene (72,000 mt/y), xylene mix (88,000 mt/y).

KUWAIT

PETROCHEMICAL INDUSTRIES CO.
Shuaiba. Feed: natural gas. Products: ammonia (1,000,000 mt/y), urea (792,000 mt/y).

MADAGASCAR

N-REN CORP.
Tamatave. Feed: naphtha. Product: ammonia (175 mt/d).

ZE-REN
Tamatave. Product: urea (90,000 mt/y).

MALAYSIA

BORDEN CHEMICAL
Prai. Feed: phenol, methanol, urea. Products: formaldehyde (15,000 mt/y), resins.

ESSO MALAYA BERHAD
Port Dickson. Feed: refinery gas, naphtha. Product: ammonia (53,000 mt/y).

MALAYSIAN CARBON SDN. BHD.
(Subsidiary of Cabot Corp.)
Port Dickson. Feed: heavy aromatic oil. Product: carbon black.

MEXICO

CELANESE MEXICANA SA
Cangrejera. Products: acetic acid (108,000 mt/y), acetic anhydride (33,000 mt/y), acetone (60,000 mt/y), butanol (16,000 mt/y), butyraldehyde (90,000 mt/y), vinyl acetate (25,000 mt/y).
Celaya. Products: acetic acid (63,000 mt/y), acetic anhydride (31,000 mt/y), acetone (14,000 mt/y), butanol-n (24,000 mt/y), 2-ethyl hexanol (70,000 mt/y), vinyl acetate (25,000 mt/y).
Cosoleacaque. Product: acrylic acid-esters (16,000 mt/y).
Lerma. Products: phthalic anhydride (18,500 mt/y), plasticizers (10,100 mt/y).
Ocotlan. Products: polyamide (16,860 mt/y), polyester (9,900 mt/y).
Queretaro. Products: polyamide (7,000 mt/y), polyester (69,000 mt/y).
Toluca. Products: polyamide (12,000 mt/y), polyester (23,600 mt/y).
Zacapu. Products: acrylics (10,600 mt/y).

DERIVADOS MALEICOS SA DE CV
Puebla. Feed: benzene. Product: maleic anhydride (7,000 mt/y).

FENOQUIMIA SA
(50-50 Celanese Mexicana and Industrias Resistol)
Cosoleacaque, Ver. Feed: cumene, methanol. Products: acetone (15,000 mt/y), phenol (25,000 mt/y).

FERTILIZANTES MEXICANOS SA
Coatzacoalcos (Pajaritos). Product: urea (495,000 mt/y).
Cuautitlan. Feed: natural gas. Products: ammonia (22,000 mt/y).
Ciudad Camargo. Feed: ammonia, CO_2. Product: urea (75,000 mt/y).

Minatitlan. Product: urea (302,000 mt/y).
Salamanca. Product: urea (386,000 mt/y).

GLICOLES MEXICANOS SA DE CV

Apizaco, Tlaxcala. Feed: ethylene oxide. Product: ethylene glycol (100,000 mt/y).

HULES MEXICANOS SA

(owned by Pemex and Polysar Ltd.)

Altamira, Tam. Feed: styrene, butadiene, acn. Product: SBR (45,000 mt/y).

INDUSTRIAS DERIVADAS DEL ETILENO SA

Puebla, Pue. Feed: ethylene oxide, propylene oxide. Product: ethylene glycol (30,000 mt/y), propylene glycol (10,000 mt/y).

INDUSTRIAS RESISTOL SA

Lecheria. Products: ABS (11,040 mt/y), polystyrene (13,200 mt/y), polyvinyl chloride (10,000 mt/y), SAN (2,760 mt/y), SBR (6,000 mt/y).

Lerma. Products: formaldehyde (32,000 mt/y), SBR (10,500 mt/y).

Xicohtzinco. Products: polystyrene (27,000 mt/y), polyvinyl chloride (35,000 mt/y).

LUGATOM SA

Cuautitlan. Feed: orthoxylene. Products: phthalic anhydride (3,600 mt/y).

NEGROMEX SA

(owned by Phillips Petroleum and Mexican interests)

Salamanca. Feed: aromatic oils, butadiene, styrene. Products: carbon black (49,600 mt/y), rubber (70,000 mt/y).

PETROCEL SA

Altamira, Tamps. Feed: methanol, paraxylene. Products: dimethyl terephthalate (242,000 mt/y), terephthalic acid (55,000 mt/y).

PETROLEOS MEXICANOS

Atzcapotzalco. Feed: benzene, propylene tet, refinery gas. Products: dodecyclbenzene (15,000 mt/y), propylene (27,000 mt/y), propylene tet (10,900 mt/y).

Cadereyta, N.L. Feed: refinery gas. Product: propylene (45,000 mt/y).

Camargo, Chihuahua. Feed: natural gas. Products: ammonia (132,000 mt/y).

Cangrejera, Veracruz. Feed: air, benzene, ethylene, propylene. Product: acetaldehyde (100,000 mt/y), ethylene oxide (100,000 mt/y), cumene (40,000 mt/y), oxygen (200,000 mt/y).

Ciudad Madero, Tamaulipas. Feed: benzene, butylenes, ethylbenzene, ethylene, propylene, refinery gas. Products: butadiene (55,000 mt/y), dodecyclbenzene (15,000 mt/y), ethylbenzene (39,400 mt/y), ethylene (14,000 mt/y), propylene (61,000 mt/y), propylene tet (10,900 mt/y), styrene (30,000 mt/y).

Cosoleacaque, Veracruz. Feed: natural gas, propylene. Products: acetonitrile (230 mt/y), acrylonitrile (24,000 mt/y), ammonia (2,440,000 mt/y), paraxylene (40,000 mt/y).

Minatitlan, Veracruz. Feed: benzene, ethylene, naphtha, refinery gas. Products: heavy aromatics (7,400 mt/y), benzene (124,250 mt/y), ethylbenzene (17,550 mt/y), meta-para xylene (40,600 mt/y), orthoxylene (11,250 mt/y), toluene (100,000 mt/y).

Pajaritos, Veracruz. Feed: ethylene, dichloroethane. Products: acetaldehyde (44,000 mt/y), dichloroethane (152,690 mt/y), ethylene (209,210 mt/y), ethylene oxide (28,000 mt/y), vinyl chloride (70,000 mt/y).

Poza Rica, Veracruz. Feed: ethane, natural associated gas. Products: ethylene (182,000 mt/y), ld polyethylene (51,000 mt/y), hd polyethylene (100,000 mt/y).

Reynosa, Tamaulipas. Feed: ethane, natural associated gas. Products: ethylene (27,200 mt/y), hd polyethylene (18,000 mt/y).

Salamanca, Guanajuato. Feed: natural gas, propylene. Products: ammonia (391,000 mt/y), isopropanol (15,000 mt/y).

Salina Cruz, Oax. Feed: refinery gas. Product: propylene (45,000 mt/y).

San Martin, Texmelucan, Puebla. Feed: natural gas. Product: methanol (171,500 mt/y).

Tula, Hidalgo. Feed: ammonia, natural gas, propylene. Products: acetonitrile (1,040 mt/y), acrylonitrile (50,000 mt/y).

POLICYD SA

Mexico City and Tampico. Feed: vinyl chloride monomer. Product: polyvinyl chloride (115,000 mt/y).

POLIESTIRENO Y DERIVADOS SA DE CV

Apizaco, Tlaxcala. Product: polystyrene (20,000 mt/y).

POLIMEROS DE MEXICO SA

Moyotzingo, Puebla. Feed: vinyl chloride monomer. Product: polyvinyl chloride (30,000 mt/y).

POLIOLES SA DE CV

(Mexican shareholders and BASF Wyandotte Corp.)

Lerma (State of Mexico). Feed: ethylene oxide, propylene oxide. Products: ethylene glycol, propylene oxide.

POLIVIN SA DE CV

Apaseo El Grande, Guanajuato. Feed: vinyl acetate. Product: polyvinyl alcohol (2,400 mt/y).

PROMOCIONES INDUSTRIALES MEXICANAS SA DE CV

Altamira, Tamps. Feed: orthoxylene, monovinyl chloride. Products: phthalic anhydride (30,000 mt/y), polyvinyl chloride (115,000 mt/y).

QUIMICA BORDEN SA DE CV

Xalostoc. Feed: methanol. Products: formaldehyde (33,000 mt/y).

SINTESIS ORGANICAS SA

Puebla, Pue. Feed: orthoxylene, 2 ethylhexanol. Products: phthalic anhydride (14,000 mt/y), plasticizers (15,000 mt/y).

UNIVEX SA

(DSM affiliate)

Salamanca, Gto. Product: caprolactam (50,000 mt/y).

MOROCCO

SNEP—Societe Nationale d'Electrolyse et de Petrochemie

Mohammedia. Products: polyvinyl chloride (25,000 mt/y), vinyl acetate (25,000 mt/y).

NETHERLANDS

AKZO ZOUT CHEMIE NEDERLAND BV

[illegible]. Feed: ethylene, chlorine, HCl. Product: [illegible]ride (500,000 mt/y).

ARCO CHEMIE NEDERLAND LTD.

(100% Arco Chemical Co.)

Rotterdam. Feed: isobutane and propylene. Product: butanol (150,000 mt/y), isobutylenes (60,000 mt/y), propylene glycol (50,000 mt/y), propylene oxide (180,000 mt/y).

CINDU CHEMICALS BV

Uithoorn (near Amsterdam). Feed: coal tar. Products: carbon black feedstock (10,000 mt/y), naphthalene (10,000 mt/y).

DOW CHEMICAL EUROPE

Terneuzen. Products: benzene, butadiene, cumene, ethylene, ethylbenzene, ethylene glycol, ethylene oxide, ld-lld polyethylene, polystyrene, propylene, SB-latex, styrene.

DSM

Chemical Products Division

South Limburg. Products: acetylene (2,000 mt/y), acrylonitrile (160,000 mt/y), caprolactam (230,000 mt/y), melamine (60,000 mt/y).

Chemische Industrie Rijnmond

Botlek. Feed: toluene. Product: phenol (160,000 mt/y).

Methanol Chemie Nederland VoF

Delfzijl and Rotterdam. Products: formaldehyde (120,000 mt/y), resins (200,000 mt/y).

Methanor VoF.

Delfzijl. Product: methanol (720,000 mt/y).

Plastics Division

South Limburg. Feed: C_4, C_5, naphtha, gas oil. Products: benzene (150,000 mt/y), butadiene (110,000 mt/y), ethylene-propylene rubber (50,000 mt/y), ethylene (800,000 mt/y), MTBE (75,000 mt/y), ld polyethylene (370,000 mt/y), hd polyethylene (150,000 mt/y), polypropylene (110,000 mt/y), polyvinyl chloride (180,000 mt/y), propylene (450,000 mt/y), ABS (50,000 mt/y).

HOECHST HOLLAND NV

Breda. Feed: styrene. Product: polystyrene (150,000 mt/y).

Vlissingen. Feed: p-xylene, methanol. Product: dimethyl terephthalate (85,000 mt/y).

ICI HOLLAND BV

Rozenburg. Products: acrylics, nylons, ld polyethylene, polypropylene.

KEMIRA BV

(subsidiary of Kemira Oy)

Rozenburg. Feed: natural gas. Products: ammonia (530,000 mt/y), urea (230,000 mt/y).

NEDERLANDSE STIKSTOF MAATSCHAPPIJ NV

Sluiskil. Feed: natural gas. Products: ammonia (1,250,000 mt/y), urea (730,000 mt/y).

PHILBLACK NEDERLAND BV

(subsidiary of Phillips Petroleum Co.)

Rotterdam. Feed: [illegible]matic oil. Product: carbon black (47,000 mt/y).

POLYSAR LTD.

Arnhem. Feed: butadiene, styrene. Product: SBR latex (45,000 mt/y).

SHELL NEDERLAND CHEMIE BV

Moerdijk. Feed: naphtha, gas oil. Products: butadiene (115,000 mt/y), ethylbenzene (360,000 mt/y), ethylene (500,000 mt/y), ethylene glycol (160,000 mt/y), ethylene oxide (180,000 mt/y), propylene (300,000 mt/y), propylene oxide (125,000 mt/y), styrene (330,000 mt/y), vinyl esters (40,000 mt/y).

Pernis. Feed: naphtha. Products: acetone (150,000 mt/y), alphaolefins (160,000 mt/y), bisphenol A (60,000 mt/y), butylenes (40,000 mt/y), isoprene (60,000 mt/y), isopropanol (290,000 mt/y), MTBE (100,000 mt/y), polypropylene (60,000 mt/y), polyvinyl chloride (200,000 mt/y), SBR (120,000 mt/y), resins (55,000 mt/y), BR-latex (20,000 mt/y), isoprene rubber (70,000 mt/y).

UNIE VAN KUNSTMESTFABRIEKEN BV

Geleen (Stikstofbindingsbedrijf SBB BV). Feed: natural gas. Products: ammonia (740,000 mt/y—with Carbochimique, Belgium), urea (480,000 mt/y).

Ijmuiden (Mekog BV). Feed: natural gas. Product: ammonia (290,000 mt/y).

Pernis (Ammoniak Unie BV). Feed: natural gas. Product: ammonia (300,000 mt/y—with BASF).

Pernis (Albatros BV). Feed: natural gas. Product: urea (150,000 mt/y).

NETHERLANDS ANTILLES

SHELL CURACAO

Curacao. Feed: platformate. Products: benzene (25,000 mt/y), toluene (80,000 mt/y), xylenes mix (80,000 mt/y).

NEW ZEALAND

PETRALGAS CHEMICALS NZ LTD.

(51% Petrocorp, 49% Alberta Gas Chemicals Ltd.)

Taranaki, Waitara. Feed: Maui gas. Product: methanol (1,450 mt/d).

PETROCORP

Taranaki, Waitara. Feed: natural gas. Products: ammonia (270 mt/d), urea (470 mt/d).

NICARAGUA

QUIMICA BORDEN CASA

Tipitapa. Feed: methanol. Product: formaldehyde (6,000 mt/y).

NORWAY

I/S NORETYL

(51% Norsk Hydro, 49% Statoil)

Rafnes, Bamble. Feed: natural gas liquids. Products: ethylene (350,000 mt/y), propylene (70,000 mt/y).

NORSK HYDRO AS

Porsgrunn. Feed: liquid gas, vinyl chloride. Products: ammonia (560,000 mt/y), polyvinyl chloride (80,000 mt/y), urea (240,000 mt/y).

Rafnes, Bamble. Feed: chlorine, ethylene. Product: ethylene dichloride (500,000 mt/y), vinyl chloride (350,000 mt/y).

NORSK KOKSVERK AS

Mo-i-Rana. Feed: coke oven gas. Products: ammonia (40,000 mt/y), benzene (5,000 mt/y), crude tar (16,000 mt/y).

PAKISTAN

DAWOOD HERCULES CHEMICALS LTD.

Chichoki Mallian. Feed: natural gas. Products: ammonia (625 mt/d), urea (1,100 mt/d).

EXXON CHEMICAL PAKISTAN LTD.

Daharki, Dist. Sukkur. Feed: natural gas. Products: ammonia (145,600 mt/y), urea (249,000 mt/y).

PERU

CONCARB DIVISION
WITCO CHEMICAL CORP.

Talara. Feed: heavy aromatic oil. Product: carbon black (20,000 mt/y).

FERTILIZANTES SINTETICOS SA

Callao. Feed: Bunker 6 fuel oil. Product: ammonia (24,000 mt/y).

PETROPERU

Talara. Feed: ammonia-carbon dioxide, FCC bottoms, isopropanol, natural gas, propane-propylene. Products: acetone (5,000 mt/y), ammonia (300 mt/d), carbon black (7,700 mt/y), isopropanol (10,650 mt/y), urea (510 mt/d).

PHILIPPINES

COLUMBIAN CARBON PHILIPPINES INC.

Bataan. Feed: heavy aromatic hydrocarbons. Product: furnace carbon black (16,000 mt/y).

LMG CHEMICALS INC.

Batangas. Feed: benzene, dodecene. Product: alkylbenzene (20,000 mt/y).

PORTUGAL

BRESFOR—Industria do Formol Lda.

Gafanha da Nazare. Feed: methanol. Product: formaldehyde (50,000 mt/y).

COMPANHIA INDUSTRIAL DE RESINAS SINTETICAS (CIRES)

Estarreja. Feed: vinyl chloride. Products: polyvinyl chloride-suspension (60,000 mt/y), polyvinyl chloride-emulsion (10,000 mt/y), vinyl chloride (15,000 mt/y).

COMPANHIA NACIONAL DE PETROQUIMICA EP

Sines. Feed: LPG, naphtha. Products: butadiene (42,000 mt/y), ethylene (300,000 mt/y), propylene (140,000 mt/y).

EPSI—Empresa de Polimeros de Sines

(85% CNP, 15% CdF Chimie)

Sines. Feed: ethylene, propylene. Products: ld polyethylene (120,000 mt/y), hd polyethylene (60,000 mt/y), polypropylene (50,000 mt/y).

PETROGAL

Porto. Feed: reformate, py-gas. Products: benzene (50,000 mt/y), orthoxylene (30,000 mt/y), paraxylene (90,000 mt/y), toluene (140,000 mt/y), xylene mix (10,000 mt/y), solvents (30,000 mt/y).

PETROQUIMICA E GAS DE PORTUGAL EP

Cabo Ruivo. Feed: alcohol, naphtha, orthoxylene. Products: ammonia (150,000 mt/y), phthalic anhydride (15,000 mt/y), plasticizers (20,000 mt/y).

QUIMIGAL—Quimica de Portugal EP

Barreiro-Lavradio. Feed: heavy fuel oil. Products: ammonia (900 mt/d), urea (90,000 mt/y).

PUERTO RICO

PHILLIPS PARAXYLENE INC.

Guayama. Feed: mixed xylenes. Product: paraxylene (213,000 mt/y).

PHILLIPS PUERTO RICO CORE

Guayama. Feed: naphtha. Products: cyclohexane (263,200 mt/y), orthoxylene (59,000 mt/y).

QATAR

QATAR FERTILIZER CO.

Umm Said. Feed: natural gas. Products: ammonia (632,000 mt/y), urea (734,000 mt/y).

QATAR PETROCHEMICAL CL.

(84% QPC, 16% CdF Chimie)

Umm Said. Feed: ethane. Products: ethylene (280,000 mt/y), propylene (5,000 mt/y).

SAUDI ARABIA

AL-JUBAIL FERTILIZER CO.

(Sabic with Taiwan Fertilizer Co.)

Al-Jubail. Feed: methane. Product: urea (500,000 mt/y).

AL-JUBAIL PETROCHEMICAL CO.

(50% Exxon Chemical Co.)

Al-Jubail. Feed: ethylene. Product: lld polyethylene (270,000 mt/y).

IBN-SINA NATIONAL METHANOL CO.

(25% Celanese, 25% Texas Eastern)

Al-Jubail. Feed: methane. Product: methanol (650,000 mt/y).

SAUDI ARABIAN FERTILIZER CO.

Al-Dammam. Feed: methane, natural gas. Products: ammonia (600 mt/d), melamine (20,000 mt/y), urea (1,000 mt/d).

SAUDI METHANOL CO.

(Sabic, W.R. Grace, Mitsubishi Gas, C. Itoh, et al.)

Al-Jubail. Feed: methane. Product: methanol (600,000 mt/y).

SAUDI PETROCHEMICAL CO.

(50% Pecten Arabia Ltd.—subsidiary of Shell Oil Co.)

Al-Jubail. Feed: ethane, benzene. Products: ethylene (656,000 mt/y), crude industrial ethanol (281,000 mt/y).

SAUDI YANBU PETROCHEMICAL CO.

(50% Mobil Oil Corp.)

Yanbu. Feed: ethane. Products: ethylene (455,000 mt/y), ethylene glycol (220,000 mt/y), lld polyethylene (205,000 mt/y), hd polyethylene (91,000 mt/y).

SOUTH AFRICA

AECI LTD.

Midland, Sasolburg. Feed: coal based acetylene and ethylene. Products: acetylene (47,000 mt/y), ethylene dichloride (56,000 mt/y), ld polyethylene (75,000 mt/y), lld polyethylene (75,000 mt/y), polyvinyl chloride (138,000 mt/y), solvents (22,000 mt/y), vinyl chloride (143,000 mt/y).

FEDMIS

(division of Sentrachem)

Milnerton. Feed: refinery gas. Product: ammonia (100,000 mt/y).

KARBOCHEM PL

(division of Sentrachem)

Sasolburg. Feed: butadiene, styrene. Products: alkylbenzene (10,000 mt/y), SBR (40,000 mt/y).

NATIONAL CHEMICAL PRODUCTS LTD

(division of Sentrachem)

Germiston and Durban. Feed: molasses, naphthalene, orthoxylene, styrene. Products: acetaldehyde (12,500 mt/y), acetic acid (10,000 mt/y), ethanol (46,000 mt/y), formaldehyde (20,000 mt/y), maleic anhydride (3,000 mt/y), phthalic anhydride (35,000 mt/y), plasticizers (45,000 mt/y), solvents (25,000 mt/y).

PHILLIPS CARBON BLACK CPL

(Owned by Phillips Petroleum, National Selections Ltd., and Industrial Selections Ltd.)

Port Elizabeth. Feed: aromatic oils. Product: carbon black (57,000 mt/y).

SAFRIPOL PTY.

(50% Hoechst)

Sasolburg. Feed: ethylene, propylene. Products: hd polyethylene (76,000 mt/y), polypropylene (35,000 mt/y).

SASOL ONE PL

Secunda. Feed: systhesis gas. Products: acetone, ammonia, butanol, ethanol, ethylene, methanol, phenol, styrene.

Sasolburg. Feed: synthesis gas. Products: acetone, ammonia, aromatics mix, butanol, ethanol, methanol, phenol.

SPAIN

AISCONDEL SA

Monzon (Huesca). Feed: acrylonitrile, butadiene, styrene. Products: ABS (8,000 mt/y), polystyrene (12,000 mt/y), polyvinyl chloride (45,000 mt/y suspension, 10,000 mt/y plastisol), rubber chemicals (1,000 mt/y), SAN (4,000 mt/y).

Vilaseca (Tarragona). Feed: ethylene, ethylene dichloride. Products: ethylene dichloride (240,000 mt/y), polyvinyl chloride (40,000 mt/y), vinyl chloride (150,000 mt/y).

ALCUDIA SA

Puertollano and Tarragona. Feed: ethylene. Products: ld polyethylene (280,000 mt/y), polypropylene (60,000 mt/y).

ARRAHONA SA

Prat. Feed: styrene. Product: ABS (8,000 mt/y), polystyrene (50,000 mt/y).

BASF ESPANOLA SA

(wholly owned by BASF)

Tarragona. Feed: acrylates, butadiene, naphtha, orthoxylene, propylene, styrene. Products: butanols (20,000 mt/y), oxoalcohols-2ethylhexanol (28,000 mt/y), phthalic anhydride (16,500 mt/y), polyamide (4,000 mt/y), polystyrene (20,000 mt/y), plasticizers (40,000 mt/y), solvents (6,600 mt/y).

BORDEN ESPANA SA

Axpe-Bilbao. Feed: methanol. Products: formaldehyde (60,000 mt/y).

BRILEN SA

Barbastro. Feed: dimethyl terephthalate, ethylene glycol. Products: methanol (6,000 mt/y), polyester (18,000 mt/y).

CALATRAVA

(100% Empetrol)

Puertollano. Feed: ethylene, mixed C-4 stream. Products: butadiene (32,000 mt/y), hd polyethylene (60,000 mt/y).

Santander. Feed: aromatic oil, butadiene, styrene. Products: carbon black (37,000 mt/y), SBR-PB (82,000 mt/y).

Tarragona. Feed: ethylene, C-4. Products: butadiene (100,000 mt/y), hd polyethylene (60,000 mt/y).

CARBON BLACK ESPAÑOLA SA
(100% Cepsa)

San Roque. Feed: heavy aromatic oils. Product: carbon black (25,000 mt/y).

CEPSA—Compañia Española de Petroleos SA
Luchana-Baracaldo-Bilbao. Feed: naphtha. Products: phthalic anhydride (13,000 mt/y), plasticizers (39,000 mt/y).

San Roque. Feed: naphtha. Products: benzene (78,000 mt/y), maleic anhydride (10,000 mt/y), orthoxylene (42,000 mt/y), paraxylene (37,000 mt/y), phthalic anhydride (21,000 mt/y), propylene (48,000 mt/y), toluene (120,000 mt/y), xylene mix (136,000 mt/y), solvents (71,000 mt/y).

DOW CHEMICAL IBERICA SA
Bilbao. Products: polystyrene, SB-latex.

Tarragona. Products: benzene, ethylene, hd-ld-lld polyethylene, propylene.

EMPETROL
Puertollano. Feed: naphtha. Products: benzene (80,000 mt/y), butadiene (28,000 mt/y), ethylene (210,000 mt/y), propylene (100,000 mt/y).

Tarragona. Feed: LPG, naphtha. Products: butadiene (45,000 mt/y), ethylene (325,000 mt/y), propylene (150,000 mt/y).

ENFERSA—Empresa Nacional de Fertilizantes SA
Aviles, Asturias. Feed: coke gases. Product: ammonia (90,000 mt/y).

Cartagena, Murcia. Feed: naphtha. Products: ammonia (240,000 mt/y), urea (145,000 mt/y).

Puertollano, Ciudad Real. Feed: naphtha. Products: ammonia (180,000 mt/y), urea (110,000 mt/y).

ERTISA
Palos de la Frontera, Huelva. Feed: benzene, propylene. Products: acetone (50,000 mt/y), cumene (120,000 mt/y), phenol (85,000 mt/y).

EXPLOSIVOS RIO TINTO
Guardo. Feed: acetic acid, acetylene, calcium carbide, methanol, vinyl acetate. Products: acetylene (13,000 mt/y), polyvinyl alcohol (1,800 mt/y), vinyl acetate (30,000 mt/y).

Huelva. Feed: ammonia, benzene, naphtha. Products: cyclohexane (80,000 mt/y), ammonia (390,000 mt/y), benzene (120,000 mt/y), urea (237,000 mt/y).

Tarragona. Feed: ethylene, methanol, vinyl acetate. Products: polyvinyl alcohol (6,000 mt/y), vinyl acetate (30,000 mt/y).

HISPAVIC INDUSTRIAL SA
Martorell. Feed: vcm. Product: polyvinyl chloride.

Torrelavega. Feed: ethylene. Product: polyvinyl chloride, vinyl chloride.

INTERQUISA—Intercontinental Quimica SA
(50% Cepsa, 50% Amoco International)

Algeciras. Feed: methanol, paraxylene. Products: dimethyl terephthalate (100,000 mt/y), terephthalic acid (80,000 mt/y).

MONTORO
(joint venture of Atlantic Richfield and Empetrol)

Puertollano. Feed: benzene, ethylene, propylene. Products: propylene oxide (45,000 mt/y), styrene (100,000 mt/y).

PAULAR
Morell, Tarragona. Feed: ammonia, propylene. Product: acrylic acid-esters (30,000 mt/y), acrylonitrile (75,000 mt/y).

PETROQUIMICA ESPANOLA SA
(100 % Cepsa)

San Roque (Cadiz). Feed: benzene, heavy naphtha, n-paraffins. Products: alkylbenzene (165,000 mt/y), n-paraffins (165,000 mt/y).

PRODUCTOS QUIMICOS DEL MEDITERRANEO SA
El Grao, Castellon de la Plana. Feed: cyclohexane. Product: caprolactam (39,000 mt/y).

RIO RODANO SA
Guturribay, Vizcaya. Feed: styrene, butadiene. Product: SBR latex (10,000 mt/y).

Hernani, Guipuzcoa. Feed: chlorine, normal paraffins, vinyl chloride monomer. Products: polyvinyl chloride (25,000 mt/y), plasticizers (3,000 mt/y).

Miranda de Ebro, Burgos. Feed: glycols, maleic anhydride, oxoalcohols, orthoxylene, vinyl chloride monomer. Products: polyester (22,000 mt/y), polyvinyl chloride (75,000 mt/y), plasticizers (18,000 mt/y).

TARRAGONA QUIMICA SA
(100% Hoechst)

Tarragona. Feed: olefins. Products: hd polyethylene (100,000 mt/y), polypropylene (80,000 mt/y), vinyl acetate (75,000 mt/y).

VINICLOR SA
Martorell, Barcelona. Feed: ethylene. Product: vinyl chloride (240,000 mt/y).

SRI LANKA

STATE FERTILIZER MANUFACTURING CORP.
Sapugaskanda. Feed: naphtha. Products: ammonia (86,476 mt/y), urea (138,458 mt/y).

SUDAN

N-REN CORP.
Khartoum. Feed: naphtha. Product: ammonia (175 mt/d).

SWEDEN

BEROXO AB
Ornsköldsvik. Feed: butyraldehyde. Product: butanol (30,000 mt/y), oxoalcohols (10,000 mt/y).

Stenungsund. Feed: propylene. Products: butyraldehyde (125,000 mt/y), oxoalcohols (75,000 mt/y), plasticizers (35,000 mt/y).

DOW CHEMICAL
Norrkoeping. Product: SB-latex.

ESSO CHEMICAL AB
Stenungsund. Feed: gas oil, LPG, naphtha. Products: butadiene (100,000 mt/y), ethylene (360,000 mt/y), propylene (175,000 mt/y).

KATALYS AB
(100% Beroxo AB)

Nol. Feed: orthoxylene. Product: phthalic anhydride (17,000 mt/y).

NORSK HYDRO PLAST AB
Stenungsund. Feed: chlorine, ethylene. Products: ethylene dichloride (280,000 mt/y), polyvinyl chloride (100,000 mt/y), vinyl chloride (110,000 mt/y).

NORDISK PHILBLACK AB
(owned by Phillips Co. and Rederiaktiebolaget Nordstjernan)

Malmo. Feed: aromatic oils. Product: furnace carbon black (33,000 mt/y).

PERSTORP AB
Perstorp. Feed: methanol. Product: formaldehyde (18,000 mt/y).

SVENSKA POLYSTYREN FABRIKEN AB
Trellerborg. Feed: styrene. Product: polystyrene (40,000 mt/y).

UNIFOS KEMI AB
(Neste Oy)

Stenungsund. Feed: ethylene. Products: ld, hd, md, lld polyethylene (440,000 mt/y).

SWITZERLAND

ICI
Sins. Product: polyvinyl chloride (80,000 mt/y).

LONZA AG
Visp. Feed: LVN-LPG. Products: acetaldehyde, acetic acid, acetic anhydride, acetylene (15,000 mt/y), ammonia (40,000 mt/y), aniline (3,000 mt/y), ethylene (30,000 mt/y), formaldehyde.

SYRIA

GENERAL FERTILIZER CO.
Kattineh-Homs. Feed: naphtha. Products: ammonia (1,000 mt/d), urea (1,050 mt/d).

TRINIDAD

FEDERATION CHEMICALS LTD.
(subsidiary of W.R. Grace & Co.)

Point Lisas. Feed: natural gas. Products: ammonia (231,300 mt/y).

FERTILIZERS OF TRINIDAD & TOBAGO LTD.
Point Lisas. Feed: natural gas. Product: ammonia (2,088 mt/d).

TEXACO TRINIDAD INC.
Pointe-a-Pierre. Feed: crude. Products: benzene (69,000 mt/y), cyclohexane (30,000 mt/y), n-paraffins (90,000 mt/y), toluene (90,000 mt/y), xylene mix (13,000 mt/y).

TRINIDAD NITROGEN
(49% W. R. Grace & Co., and Government of Trinidad-Tobago)

Point Lisas. Feed: natural gas. Product: ammonia (370,100 mt/y).

TURKEY

BASF-SUMERBANK TURK KIMYA SANAYII AS
Gebze. Feed: methanol. Product: formaldehyde (30,000 mt/y).

PETKIM PETROKIMYA AS
Aliaga-Izmir. Feed: ammonia, NaCl, naphtha, pyrolysis gasoline. Products: acrylonitrile (70,000), benzene (124,000 mt/y), butadiene (80,000 mt/y), ethylene (300,000 mt/y), ethylene glycol (68,000 mt/y), ethylene oxide (54,000 mt/y), orthoxylene (65,000 mt/y), paraxylene (132,000 mt/y), phthalic anhydride (30,000 mt/y), ld polyethylene (150,000 mt/y), hd polyethylene (40,000 mt/y), polypropylene (60,000 mt/y), polyvinyl chloride (100,000 mt/y), propylene (150,750 mt/y), terephthalic acid (70,000 mt/y), vinyl chloride (105,000 mt/y).

Yarimca-Izmit. Feed: naphtha, NaCl, aromatic oil, benzene, C_4, ammonia, sulfur. Products: alkylbenzene (20,000 mt/y), aromatics mix (1,500 mt/y), butadiene (33,000 mt/y), caprolactam (25,000 mt/y), carbon black (30,000 mt/y), cyclohexane (30,000 mt/y), ethylene (55,000 mt/y), ethylene dichloride (78,000 mt/y), ld polyethylene (24,300 mt/y) polystyrene (13,500 mt/y), polyvinyl chloride (46,800 mt/y), propylene (39,600 mt/y), styrene (19,450 mt/y), vinyl chloride (48,600 mt/y), CBR (13,500 mt/y), SBR (32,150 mt/y).

SASA
Adana. Feed: methanol, monoethylene glycol, paraxylene. Products: dimethyl terephthalate (66,000 mt/y), polyester (58,000 mt/y).

UNITED KINGDOM

BORDEN (U.K.) LTD.
Peterlee. Feed: methanol. Products: formaldehyde (36,000 mt/y), resins.

Southampton. Feed: methanol. Products: formaldehyde (23,400 mt/y).

BORDER CHEMICALS LTD.
(100% BP Chemicals)

Grangemouth, Scotland. Feed: propylene, ammonia. Product: acrylonitrile (70,000 t/y).

BP CHEMICALS LTD.

Baglan Bay. Products: benzene concentrate (150,000 mt/y), butadiene (60,000 mt/y), ethanol (155,000 mt/y), ethylene (340,000 mt/y), isopropanol (70,000 mt/y), propylene (200,000 mt/y), styrene (220,000 mt/y), toluene (6,000 mt/y), vinyl acetate (80,000 mt/y).

Carshalton. Products: solvents and plasticizers (15,000 mt/y).

Barry. Product: resins (40,000 mt/y).

Grangemouth. Products: acetone (25,000 mt/y), benzene (250,000 mt/y), butadiene (48,000 mt/y), cumene (95,000 mt/y), ethanol (155,000 mt/y), ethylene (250,000 mt/y), phenol (60,000 mt/y), polybutylenes (48,000 mt/y), hd polyethylene (130,000 mt/y), propylene (180,000 mt/y).

Hull. Products: acetic acid (350,000 mt/y), acetone (46,000 mt/y), ethanol (25,000 mt/y), phthalic anhydride (70,000 mt/y).

Wilton. Products: butadiene (45,000 mt/y), ethylene (130,000 mt/y), ld polyethylene (70,000 mt/y), propylene (60,000 mt/y).

CIBA-GEIGY LTD.

Duxford, Cambridge. Feed: methanol. Product: formaldehyde (120,000 mt/y).

CONOCO LTD.

South Killingholme, Humberside. Feed: reformate. Product: benzene (110,000 mt/y).

DOW CHEMICAL

Barry. Product: polystyrene.

ENOXY CHEMICAL LTD.

Grangemouth, Scotland. Feed: butadiene, styrene, ethylene, propylene. Products: polybutadiene (45,000 mt/y), polypropylene (5,000 mt/y), SBR (40,000 mt/y), ethylene-propylene rubber (15,000 mt/y).

Hythe, Hampshire. Feed: acrylonitrile, butadiene, ethylbenzene. Products: styrene (60,000 mt/y), ABS (20,00 mt/y), SBR (270,000 mt/y).

ESSO CHEMICAL LTD.

Fawley. Feed: petroleum fraction. Products: butyl-halobutyl rubber (50,000 mt/y).

ESSOCHEM OLEFINS INC. Fawley. Feed: petroleum fractions. Products: butadiene (80,000 mt/y), ethylene (105,000 mt/y), higher olefins (175,000 mt/y), isobutylene (60,000 mt/y), propylene (100,000 mt/y).

IMPERIAL CHEMICAL INDUSTRIES LTD.

Barry. Product: polyvinyl chloride (90,000 mt/y).

Billingham. Products: acrylics, acetone (45,000 mt/y), nylons, oxoalcohols (250,000 mt/y), phenol (60,000 mt/y), solvents.

Castner-Kellner, Runcorn. Product: polyvinyl chloride (112,000 mt/y).

Hillhouse, Lancashire. Product: polyvinyl chloride (175,000 mt/y).

North Tees. Products: aromatics-benzene, cumene, cyclohexane, ethylbenzene, toluene, mixed xylenes.

Wilton. Products: butadiene, ethylene, ethylene glycols, ethylene oxide, nylon 66, paraxylene, polypropylene (200,000 mt/y), propylene, terephthalic acid, solvents, plasticizers, resins.

MONSANTO PLC

Seal Sands, Cleveland. Feed: propylene. Product: acrylonitrile (205,000 mt/y).

SEVALCO LTD.
(owned by Columbian Chemicals and Phillips Petroleum)

Avonmouth, Bristol. Feed: heavy aromatic oils. Product: furnace and thermal carbon black (67,000 mt/y).

SHELL CHEMICALS U.K. LTD.

Carrington. Feed: gas oil, naphtha. Products: butadiene (30,000 mt/y), butylenes, ethylene (150,000 mt/y), ethylene glycol (60,000 mt/y), ethylene oxide (75,000 mt/y), ld polyethylene (105,000 mt/y), polypropylene (110,000 mt/y), polystyrene (70,000 mt/y), propylene (90,000 mt/y).

Shell Haven. Feed: benzene. Product: alkylbenzene.

Stanlow. Feed: naphtha, refinery gases. Products: acetone, benzene (400,000 mt/y), butanol, butylenes, isopropanol, oxoalcohols (100,000 mt/y), propylene (40,000 mt/y), higher olefins (170,000 mt/y).

UKF FERTILIZERS LTD.

Ince, Chester. Feed: natural gas. Products: ammonia (250,000 mt/y).

UNITED STATES

AGRICO CHEMICAL CO.
(one of the Williams Companies)

Blytheville, Ark. Feed: natural gas. Products: ammonia (320,000 mt/y), urea (300,000 mt/y).

Donaldsonville, La. Feed: natural gas. Products: ammonia (385,000 mt/y), urea (180,000 mt/y).

Fort Madison, Iowa. Feed: natural gas. Product: ammonia (310,000 mt/y).

Verdigris, Okla. Feed: natural gas. Products: ammonia (770,000 mt/y), urea (370,000 mt/y).

AIR PRODUCTS AND CHEMICALS INC.

Calvert City, Ky. Feed: vinyl acetate, vinyl chloride. Products: acetic acid (34,029 mt/y), polyvinyl alcohol (27,223 mt/y), polyvinyl chloride (136,116 mt/y).

New Orleans, La. Feed: natural gas. Product: ammonia (245,000 mt/y).

Pensacola, Fla. Feed: ammonia, natural gas, vinyl chloride. Products: ammonia (90,000 mt/y), methanol (180,000 mt/y), polyvinyl chloride (90,700 mt/y), urea (20,000 mt/y).

ALLIED CORP.

Baton Rouge, La. Product: hd polyethylene (363,000 mt/y).

Chesterfield, Va. and Columbia, S.C. Product: nylons (268,000 mt/y).

Geismar, La. Feed: ethane, propane. Products: butadiene (16,000 mt/y), ethylene (325,000 mt/y), propylene (21,000 mt/y).

Hopewell, Va. Product: ammonia (318,000 mt/y), caprolactam (249,000 mt/y).

Moncure, N.C. Product: polyester (54,000 mt/y).

Philadelphia. Products: acetone (147,000 mt/y), phenol (240,000 mt/y).

AMERICAN CYNAMID CO.

Fortier, La. Feed: natural gas, propylene. Products: acrylonitrile (122,470 mt/y), ammonia (610,000 mt/y), melamine (31,750 mt/y).

AMERICAN HOECHST CORP.

Chesapeake, Va. Feed: styrene. Product: Polystyrene (103,000 mt/y).

Leominster, Mass. Feed: styrene. Product: polystyrene (35,000 mt/y).

Manchester, N.H. Feed: caprolactam. Product: nylon 6 resin (10,000 mt/y).

Pasadena, Tex. Feed: benzene, ethylene. Product: high molecular weight hd polyethylene (220 million t/y), styrene (408,000 mt/y).

Peru, Ill. Feed: styrene. Product: polystyrene (137,000 mt/y).

Spartanburg, S.C. Feed: DMT, TPA, glycol. Product: polyester (200,000 mt/y).

AMOCO CHEMICALS CORP.

Cedar Bayou, Tex. Feed: propylene. Product: polypropylene (209,000 mt/y).

Chocolate Bayou, Tex. Feed: ethane, ethylene, naphtha, propane, propylene. Products: aromatics (65,000 mt/y), butadiene (91,000 mt/y), ethylene (675,000 mt/y), hd polyethylene (161,000 mt/y), polypropylene (259,000 mt/y), propylene (237,000 mt/y).

Cooper River, S.C. Feed: paraxylene. Product: terephthalic acid (544,000 mt/y).

Decatur, Ala. Feed: paraxylene, xylene. Products: paraxylene (454,000 mt/y), terephthalic acid (647,000 mt/y).

Joliet, Ill. Feed: butane, metaxylene, styrene. Products: isophthalic acid (73,000 mt/y), maleic anhydride (32,000 mt/y), polystyrene (100,000 mt/y).

Texas City, Tex. Feed: aromatics, benzene, butylenes, ethylene, propylene, xylene. Products: metaxylene (110,000 mt/y), paraxylene (534,000 mt/y), polyisobutylene (112,000 mt/y), propylene (238,000 mt/y), solvents (162,000 mt/y), styrene (358,000 mt/y).

Torrance, Calif. Feed: styrene. Product: polystyrene (13,000 mt/y).

Whiting, Ind. Feed: butylenes, methanol. Product: polyisobutylene (75,000 mt/y).

Willow Springs, Ill. Feed: styrene. Products: MTBE (117,000 mt/y), polystyrene (35,000 mt/y).

AMOCO OIL CO.

Texas City, Tex. Feed: crude oil. Products: benzene (352,000 mt/y), propylene (226,000 mt/y), toluene (952,000 mt/y), xylene mix (781,000 mt/y).

Whiting, Ind. Feed: crude oil. Products: propylene (110,000 mt/y), xylene mix (602,000 mt/y).

ARCO CHEMICAL CO.

Bayport, Tex. Feed: isobutane, propylene. Products: acetone (17,700 mt/y), propylene glycol (113,400 mt/y), propylene oxide (508,350 mt/y).

Beaver Valley, Pa. Feed: styrene. Products: polystyrene (244,900 mt/y), styrene (99,800 mt/y).

Channelview, Tex. Feed: ethane, gas oils, naphthas, mixed C_4's, natural gas, propane. Products: benzene (183,600 mt/y), butadiene (227,000 mt/y), butylenes (409,800 mt/y), ethylbenzene (612,250 mt/y), ethylene (1,269,840 mt/y), isoprene (34,000 mt/y), isopropanol (14,900 mt/y), methanol (605,000 mt/y), polybutadiene (8,150 mt/y), propylene (845,700 mt/y), propylene oxide (235,850 mt/y), styrene (542,220 mt/y), toluene (92,200 mt/y).

Houston, Tex. Feed: refinery feeds. Products: benzene (240,400 mt/y), orthoxylene (99,800 mt/y), paraxylene (181,400), toluene (72,450 mt/y).

Port Arthur, Tex. Feed: ethylene. Products: ethylene dichloride (272,100 mt/y).

ASHLAND CHEMICAL CO.

Catlettsburg, Ky. Feed: crude oil, coal tar light oil. Products: aromatics mix (30 mt/d), cumene (500 mt/d), toluene (280 mt/d), xylene mix (210 mt/d), solvents (600 mt/d).

Neal, W. Va. Feed: n-butane. Product: maleic anhydride (22,686 mt/y).

CARBON BLACK PLANTS:
Aransas Pass, Tex. 72,575 mt/y
Belpre, Ohio 54,500 mt/y
Ivanhoe, La. 122,700 mt/y

ATLAS POWDER CO.
(subsidiary of Tyler Corp.)

Joplin, Mo. Feed: natural gas. Products: ammonia (355 mt/d), urea (195 mt/d).

BADISCHE CORP.

Freeport, Tex. Feed: natural gas, propylene. Products: acrylic acid-esters (170,000 mt/y), caprolactam (160,000 mt/y), oxoalcohols (100,000 mt/y), nylons (105,000 mt/y).

Kearny, N.J. Feed: orthoxylene, oxoalcohols. Products: phthalic anhydride (80,000 mt/y), plasticizers (110,000 mt/y).

BASF WYANDOTTE CORPORATION

Geismar, La. Feed: ethylene. Product: ethylene glycol (150,000 mt/y), ethylene dichloride, ethylene oxide (215,000 mt/y).

Jamesburg, N.J. Feed: styrene. Product: expandable polystyrene (95,000 mt/y).

BISON NITROGEN PRODUCTS CO.

Woodward, Okla. Feed: ammonia, carbon dioxide. Product: urea (285 mt/d).

BORDEN CHEMICAL CO.
Chemical Division

Demopolis, Ala. Feed: methanol. Product: formaldehyde (30,657 mt/y).

Diboll, Tex. Feed: methanol. Product: formaldehyde (43,533 mt/y).

Fayetteville, N.C. Feed: methanol. Product: formaldehyde (101,167 mt/y).

Fremont, Calif. Feed: methanol. Product: formaldehyde (70,511 mt/y).

Geismar, La. Feed: methanol, natural gas. Products: acetic acid (63,500 mt/y), acetylene (46,200 mt/y), ammonia (360,000 mt/y), formaldehyde (115,270 mt/y), methanol (541,300 mt/y), urea (192,700 mt/y), vinyl acetate (63,000 mt/y), vinyl chloride (300,000 mt/y).

Illiopolis, Ill. Feed: vinyl chloride, vinyl acetate. Product: vinyl chloride (280,000 mt/y).

Kent, Wash. Feed: methanol. Product: formaldehyde (36,788 mt/y).

La Grange, Ore. Feed: methanol. Product: formaldehyde (28,817 mt/y).

Louisville, Ky. Feed: methanol. Product: formaldehyde (43,533 mt/y).

Missoula, Mont. Feed: methanol. Product: formaldehyde (45,598 mt/y).

Sheboygan, Wisc. Feed: methanol. Product: formaldehyde (70,511 mt/y).

Springfield, Ore. Feed: methanol. Product: formaldehyde (109,138 mt/y).

BORG-WARNER CHEMICALS

North American plants. Product: ABS (362,874 mt/y).

Carville, La. (with Cosden Oil & Chemical). Feed: benzene, ethylene. Products: styrene (340,195 mt/y), toluene (17,000 mt/y).

Geismar, La. (with Allied Chemicals and BASF Wyandotte). Feed: ethane, propane. Products: butadiene (2,722 mt/y), ethylene (54,431 mt/y), propylene (2,558 mt/y). Note: Borg-Warner share only on all plants.

CABOT CORP.

Big Spring and Pampa, Tex.; Franklin and Ville Platte, La.; and Parkersburg, W. Va. Feed: gas and petroleum fractions. Product: carbon blacks (furnace process and thermal) (440,000 mt/y).

CELANESE CHEMICAL CO.

Bay City, Tex. Feed: ethylene, propylene. Product: butanol (113,000 mt/y), butaraldehyde (113,000 mt/y), vinyl acetate (216,000 mt/y).

Bishop, Tex. Feed: natural gas. Products: formaldehyde (818,000 mt/y), methanol (393,000 mt/y).

Clear Lake, Tex. Feed: natural gas, ethylene. Products: acetic acid (409,000 mt/y), acrylic acid-esters (136,000 mt/y), ethylene glycol (227,000), ethylene oxide (205,000 mt/y), vinyl acetate (200,000 mt/y).

Newark, N.J. Feed: methanol. Product: formaldehyde (55,000 mt/y).

Pampa, Tex. Feed: butane. Product: acetic acid (250,000 mt/y), acetic anhydride.

Rock Hill, S.C. Feed: methanol. Product: formaldehyde (55,000 mt/y).

CERTAINTEED CORP.

Lake Charles, La. Feed: vinyl chloride monomer. Product: polyvinyl chloride (100,000 mt/y).

CF INDUSTRIES INC.

Donaldsonville, La. Feed: natural gas. Products: ammonia (1,500,000 mt/y), urea (900,000 mt/y).

Terre Haute, Ind. Feed: natural gas. Product: ammonia (130,000 mt/y).

CHAMPLIN PETROLEUM CO.

Corpus Christi, Tex. Feed: crude oil. Products: benzene (62,000 mt/y), cumene (200,000 mt/y), cyclohexane (73,000 mt/y), toluene (110,000 mt/y), xylene mix (15,000 mt/y).

CHARTER INTERNATIONAL OIL CO.

Houston, Tex. Feed: West Texas sour and foreign crudes. Products: MTBE (49,688 mt/y), propylene (151,240 mt/y).

CHEMBOND CORP.

(subsidiary of Texaco Oil Co.)

Andalusia, Ala. Feed: methanol. Product: formaldehyde (32,000 mt/y).

Moncure, N.C. Feed: methanol. Product: formaldehyde (54,500 mt/y).

Springfield, Ore. Feed: methanol. Product: formaldehyde (64,000 mt/y).

Winnfield, La. Feed: methanol. Product: formaldehyde (32,000 mt/y).

CHEVRON CHEMICAL CO.

(subsidiary of Standard Oil Co. of California)

El Segundo, Calif. Feed: petroleum base stocks. Product: benzene (77,000 mt/y).

Fort Madison, Iowa. Feed: natural gas. Products: anhydrous ammonia (86,000 mt/y), urea (200 mt/d).

Luling, La. Feed: natural gas. Product: ammonia (215,000 mt/y).

Pascagoula, Miss. Feed: natural gas, petroleum base stocks. Product: ammonia (450,000 mt/y), paraxylene (227,000 mt/y).

Richmond, Calif. Feed: petroleum base stocks. Products: alkylbenzene (150,000 mt/y), polyisobutylene (27,000 mt/y).

CITGO PETROLEUM CORP.

(subsidiary of Southland Corp.)

Lake Charles, La. Feed: crude. Products: benzene (280 mt/d), propylene (334 mt/d).

CLARK CHEMICAL CORP.

(subsidiary of Clark Oil & Refining Corp.)

Blue Island, Ill. Feed: benzene-propylene. Products: acetone (23,000 mt/y), cumene (54,500 mt/y), phenol (38,600 mt/y).

COASTAL REFINING & MARKETING INC.

Corpus Christi, Tex. Feed: crude oil. Products: benzene (246,000 mt/y), xylene mix (77,000 mt/y).

COLUMBIA NITROGEN CORP.

Augusta, Ga. Feed: natural gas. Products: ammonia (500,000 mt/y), urea (360,000 mt/y).

COLUMBIAN CHEMICALS CO.

Conroe, Tex. Feed: heavy aromatic hydrocarbons. Product: carbon black (60,000 mt/y).

El Dorado, Ark. Feed: heavy aromatic hydrocarbons. Product: carbon black (45,000 mt/y).

Franklin, La. Feed: heavy aromatic hydrocarbons. Product: carbon black (114,000 mt/y).

Mojave, Calif. Feed: heavy aromatic hydrocarbons. Product: 25,000 mt/y carbon black.

Moundsville, W. Va. Feed: heavy aromatic hydrocarbons. Product: carbon black (82,000 mt/y).

Ulysses, Kansas. Feed: heavy aromatic hydrocarbons. Product: carbon black (43,000 mt/y).

COMINCO AMERICAN INC.

(Camex Operations)

Borger, Tex. Feed: natural gas. Products: ammonia (327,212 mt/y), urea (70,335 mt/y).

CONCARB DIVISION, WITCO CHEMICAL CORP.

Phenix City, Ala. Feed: heavy aromatic oil. Product: carbon black (25,000 mt/y).

Ponca City, Okla. Feed: heavy aromatic oil. Product: carbon black (59,000 mt/y).

Sunray, Tex. Feed: heavy aromatic oil. Product: carbon black (45,400 mt/y).

COOPERATIVE FARM CHEMICALS ASSOCIATION

Lawrence, Kan. Feed: natural gas. Products: ammonia (1,040 mt/d), urea (680 mt/d).

COPOLYMER RUBBER & CHEMICAL CORP.

Addis, La. Feed: petroleum derivative. Product: ethylene-propylene rubber (40,000 mt/y).

Baton Rouge, La. Feed: petroleum derivatives. Products: styrene-butadiene rubber (190,000 mt/y).

CORPUS CHRISTI PETROCHEMICAL CO.

(37.5% ICI)

Corpus Christi, Tex. Feed: gas oil, LPG, naphtha, toluene. Products: benzene (196,000 mt/y), butanes (185,000 mt/y), ethylene (545,000 mt/y), propylene (256,000 mt/y).

COSDEN OIL & CHEMICAL CO.

(subsidiary of American Petrofina Inc.)

Big Spring, Tex. Feed: crude oil. Products: polyisobutylene (16,500 mt/y), polystyrene (20,000 mt/y), propylene (34,800 mt/y).

Calumet City, Illinois. Feed: styrene. Product: polystyrene (83,800 mt/y).

Carville, La. Feed: benzene, ethylene. Product: styrene (294,800 mt/y).

Groves, Tex. Feed: LPG. Product: propylene (60,000 mt/y).

Windsor, N.J. Feed: styrene. Product: polystyrene (53,300 mt/y).

CPEX PACIFIC INC.

St. Helens, Oregon. Feed: natural gas. Products: ammonia (227 mt/d), urea (295 mt/d).

CROWN CENTRAL PETROLEUM CORP.

Pasadena, Tex. Feed: crude oil. Products: benzene (70,000 mt/y), propylene (33,000 mt/y), toluene (35,000 mt/y), xylene (35,000 mt/y).

DIAMOND SHAMROCK CORP.

Deer Park, Tex. Feed: chlorine, ethylene. Products: ethylene dichloride (440 mt/d).

Sunray, Tex. Feed: natural gas. Product: ammonia (400 mt/d).

DIVERSITECH GENERAL

Mogadore, Ohio. Feed: butadiene, styrene, vinyl pyridine. Product: SB-latex (63,500 mt/y).

Odessa, Tex. Feed: butadiene, styrene. Product: SBR (99,793 mt/y).

DIXIE CHEMICAL CO.

Bayport, Tex. Product: acrylics (450 mt/d).

DOW CHEMICAL

Freeport, Tex. Products: acetylene (4,000 mt/y), acrylonitrile-butadiene-styrene (136,000 mt/y), ammonia (47,000 mt/y), benzene (23,000 mt/y), bisphenol A (77,000 mt/y), butadiene (39,000 mt/y), ethylbenzene (795,000 mt/y), ethylene (1,136,000 mt/y), ethyl chloride (35,000 mt/y), ethylene dichloride (727,000 mt/y), ethylene glycol (115,000 mt/y), ethylene oxide (130,000 mt/y), phenol (211,000 mt/y), hd polyethylene (75,000 mt/y), ld polyethylene (400,000 mt/y), propylene (250,000 mt/y), propylene glycol (114,000 mt/y), propylene oxide (435,000 mt/y), styrene (681,000 mt/y).

Ironton, Ohio. Products: acrylonitrile (29,000 mt/y), polystyrene.

Oyster Creek (Freeport), Tex. Products: acetone (127,000 mt/y), ethylene dichloride (500,000 mt/y), vinyl chloride (350,000 mt/y).

Plaquemine, La. Products: ethylene (682,000 mt/y), ethylene dichloride (900,000 mt/y), ethylene glycol (204,000 mt/y), ethylene oxide (206,000 mt/y), hd polyethylene (120,000 mt/y), ld polyethylene (350,000 mt/y), propylene (75,000 mt/y), propylene glycol (68,000 mt/y), propylene oxide (200,000 mt/y), plasticizers (54,000 mt/y).

Torrance, Calif. Products: acrylonitrile (34,000 mt/y), polystyrene (453,000 mt/y).

EASTMAN CHEMICAL PRODUCTS INC.

Longview, Tex. Feed: propane, ethane. Products: acetaldehyde (215,000 mt/y), ethanol, ethylene, ethylene oxide, oxoalcohols, polyethylene (280,000 mt/y), polypropylene (65,000 mt/y), propylene, solvents.

EL PASO PRODUCTS CO.

Bayport, Tex. Feed: propylene. Product: polypropylene (110,000 mt/y).

Corpus Christi, Tex. Feed: BBC. Product: butadiene (95,000 mt/y).

Odessa, Tex. Feed: benzene, ethane, propane. Products: butadiene (4,000 mt/y), ethylene (236,000 mt/y), ld polyethylene (182,000 mt/y), polypropylene (55,000 mt/y), propylene (65,000 mt/y), styrene (136,000 mt/y).

ETHYL CORP.

Baton Rouge, La. Feed: ethylene. Products: ethylchloride, ethylene dichloride.

Orangeburg, S.C. Feed: ethylene. Product: alkylbenzene.

Pasadena, Tex. Feed: ethylene. Product: alphaolefins, ethylchloride, ethylene dichloride.

EXXON CHEMICAL AMERICAS

Baton Rouge, La. Feed: petroleum intermediates. Products: benzene, butadiene, butylenes, carbon black feedstocks, ethylene, isoprene, isopropanol, oxoalcohols, phthalic anhydride, ld polyethylene, propylene, ethylene-propylene rubber, butyl rubber, plasticizers, solvents.

Baytown, Tex. Feed: petroleum intermediates. Products: benzene, butadiene, butylenes mixed, carbon black feedstocks, cyclohexane, ethylene, isoprene, n-paraffins, orthoxylene, paraxylene, polyisobutylene, polypropylene, propylene, toluene, mixed xylenes, butyl rubber.

Bayway, N.J. Feed: petroleum intermediates. Products: acetone, butanol, carbon black feedstocks, polyisobutylene, propylene, solvents.

Mont Belvieu, Tex. Products: linear ld polyethylene, hd polyethylene.

FARMLAND INDUSTRIES INC.

Dodge City, Kan. Feed: natural gas. Product: ammonia (590 mt/d).

Enid, Okla. Feed: natural gas. Product: ammonia (2,280 mt/d), urea (900 mt/d).

Fort Dodge, Iowa. Feed: natural gas. Product: ammonia (570 mt/d).

Hastings, Neb. Feed: natural gas. Product: ammonia (410 mt/d).

Pollock, La. Feed: natural gas. Product: ammonia (1,140 mt/d).

FIRESTONE SYNTHETIC RUBBER & LATEX CO.

Lake Charles, La. Feed: butadiene, styrene. Product: SBR (120,000 mt/y).

Orange, Tex. Feed: butadiene. Products: polybutadiene SBR (110,000 mt/y).

GEORGIA GULF CORP.

Bound Brook, N.J. Feed: cumene. Products: acetone (43,000 mt/y), phenol (71,200 mt/y).

Delaware City, Del. Feed: vinyl chloride. Products: polyvinyl chloride (68,200 mt/y).

Houston, Tex. Feed: benzene, propylene. Product: cumene (363,600 mt/y).

Plaquemine, La. Feed: chlorine, cumene, ethylene, hydrogen, natural gas, vcm. Products: acetone (90,400 mt/y), ammonia (181,500 mt/y), methanol (379,000 mt/y), phenol (149,700 mt/y), polyvinyl chloride (317,600 mt/y), vinyl chloride (454,500 mt/y).

GEORGIA-PACIFIC CORP.

Albany, Oregon. Feed: methanol. Product: formaldehyde (54,446 mt/y).

Bellingham, Wash. Feed: pulp mill liquor. Product: ethanol (18,000 mt/y).

Columbus, Ohio. Feed: methanol. Product: formaldehyde (77,133 mt/y).

Conway, N.C. Feed: methanol. Product: formaldehyde (47,641 mt/y).

Crossett, Ark. Feed: methanol. Product: formaldehyde (72,596 mt/y).

Lufkin, Tex. Feed: methanol. Product: formaldehyde (45,372 mt/y).

Painesville, Ohio. Feed: styrene. Product: polystyrene (30,000 mt/y).

Russellville, S.C. Feed: methanol. Product: formaldehyde (99,819 mt/y).

Taylorsville, Miss. Feed: methanol. Product: formaldehyde (54,446 mt/y).

Vienna, Ga. Feed: methanol. Product: formaldehyde (45,372 mt/y).

B.F. GOODRICH CHEMICAL GROUP

Products: acrylic acid and esters, ethylene dichloride, polyvinyl chloride, vinyl chloride.

GOODYEAR TIRE & RUBBER CO.

Beaumont, Tex. Feed: C-5 streams, butadiene. Products: isoprene (81,600 mt/y), polyisoprene (60,000 mt/y), polybutadiene (116,000 mt/y).

Calhoun, Ga. Feed: butadiene, styrene. Product: SBR (41,000 mt/y).

Houston, Tex. Feed: acrylonitrile, butadiene-styrene. Products: acrylonitrile-butadiene rubber (14,000 mt/y), styrene-butadiene rubber (326,000 mt/y).

Niagara Falls, N.Y. Feed: vinyl chloride monomer. Product: polyvinyl chloride (54,000 mt/y).

Point Pleasant, W. Va. Feed: tpa, ethylene glycol. Product: polyester (154,000 mt/y).

W.R. GRACE & CO.

Memphis, Tenn. Feed: natural gas. Products: ammonia (308,400 mt/y), urea (349,300 mt/y).

GREEN VALLEY CHEMICAL CORP.

Creston, Iowa. Feed: natural gas. Product: ammonia (100 mt/d).

GULF OIL CHEMICALS CO.

Alliance, La. Feed: reformate, toluene. Products: benzene (217,000 mt/y), xylene mix (200,000 mt/y).

Baytown, Tex. Feed: distillate, LPG, ethylene, naphtha, propylene. Products: alphaolefins (107,700 mt/y), ethylene (730,000 mt/y), butadiene (190,000 mt/y), ld polyethylene (272,000 mt/y), polypropylene (181,000 mt/y), propylene (355,700 mt/y).

Marietta, Ohio. Feed: styrene. Product: polystyrene (158,700 mt/y).

Orange, Tex. Feed: ethylene. Product: ld polyethylene (136,000 mt/y), hd polyethylene (261,000 mt/y).

Philadelphia, Pa. Feed: benzene, propylene, reformate, toluene. Products: benzene (127,000 mt/y), cumene (209,000 mt/y), toluene (42,400 mt/y).

Port Arthur, Tex. Feed: benzene, ethane, propane, propylene, reformate, toluene. Products: benzene (361,000 mt/y), butadiene (22,000 mt/y), cumene (204,000 mt/y), cyclohexane (112,000 mt/y), ethylene (432,000 mt/y), propylene (165,500 mt/y), toluene (174,000 mt/y).

St. James, La. Feed: benzene, ethylene. Product: styrene (272,000 mt/y).

HAWKEYE CHEMICAL CO.

Clinton, Iowa. Feed: natural gas and hydrogen. Products: ammonia (200,000 mt/y), urea (60,000 mt/y).

HERCOFINA

(joint venture Hercules Inc. and American Petrofina)

Wilmington, N.C. Feed: paraxylene, methanol. Products: dimethyl terephthalate (640,000 mt/y), terephthalic acid (140,000 mt/y).

HERCULES INC.

Louisiana, Mo. Feed: natural gas. Product: formaldehyde (80,000 mt/y).

HIMONT USA INC.

Bayport, Tex. Feed: propylene. Product: polypropylene (225,000 mt/y).

Lake Charles, La. Feed: propylene. Product: polypropylene (360,000 mt/y).

J.M. HUBER CORP.

Baytown, Tex. Feed: refinery bottoms. Product: carbon black (318 mt/d).

Borger, Tex. Feed: refinery bottoms. Product: carbon black (235 mt/d).

ICI AMERICAS

Bayport, Tex. Feed: acetic acid, ammonia, butanol, ethanol, ethylene, methanol. Products: ethylene glycol (225,000 mt/y), ethylene oxide (225,000 mt/y), glycol ethers (35,000 mt/y), ethanolamines (16,000 mt/y), glycol ether acetates (14,000 mt/y).

INTERNATIONAL MINERALS & CHEMICAL CORP.

Sterlington, La. Feed: natural gas. Product: ammonia (840,000 mt/y).

KAISER CHEMICALS

(Division of Kaiser Aluminum & Chemical Corp.)

Pryor, Okla. Feed: natural gas. Products: ammonia (90,000 mt/y), urea (142,000 mt/y).

KOPPERS CI

Bridgeville, Pa. Feed: naphthalene. Products: phthalic anhydride (41,000 mt/y), polyester.

Chicago, Ill. Feed: naphthalene, orthoxylene. Products: phthalic anhydride (107,000 mt/y), polyester.

Follansbee, W. Va. Feed: coal tar. Product: naphthalene (70,000 mt/y).

Oxnard, Calif. Product: polyester.

Richmond, Calif. Product: polyester.

MARATHON OIL CO.

Detroit, Mich. Feed: refinery. Product: propylene (58,000 mt/y).

Robinson, Ill. Feed: refinery gas. Product: aromatics mix (19,200 mt/y).

Texas City, Tex. Feed: refinery. Products: aromatics mix (15,000 mt/y), benzene (20,000 mt/y), propylene (60,800 mt/y), toluene (75,000 mt/y), xylene mix (48,400 mt/y).

MELAMINE CHEMICALS INC.

Donaldsonville, la. Feed: urea. Product: melamine (36,000 mt/y).

MERICHEM CO.

Houston, Tex. Feed: refinery spent caustic. Product: cresylic acids (45,000 mt/y).

MISSISSIPPI CHEMICAL CORP.

Yazoo City, Miss. Feed: natural gas. Product: ammonia (1,000 mt/d), urea (460 mt/d).

MOBIL CHEMICAL CO.

(division of Mobil Oil Corp.)

Beaumont, Tex. Feed: natural gas liquids, reformate. Products: benzene (167,000 mt/y), butadiene (35,000 mt/y), butylenes (32,000 mt/y), ethylene (410,000 mt/y), ld polyethylene (150,000 mt/y), propylene (110,000 mt/y), toluene (297,000 mt/y).

Holyoke, Mass. Feed: styrene. Products: polystyrene (40,800 mt/y).

Joliet, Ill. Feed: styrene. Product: polystyrene (18,140 mt/y).

Santa Ana, Calif. Feed: styrene. Product: polystyrene (29,480 mt/y).

MONSANTO

Addyston, Ohio; Decatur, Ala; Springfield, Mass. Product: polystyrene (317,518 mt/y).

Addyston, Ohio; Muscatine, Iowa. Product: ABS (228,000 mt/y).

Alvin, Tex. Feed: propylene. Product: acrylonitrile (210,000 mt/y).

Luling, La. Feed: natural gas. Product: ammonia (210,000 mt/y).

Pensacola, Fla. Feed: butane. Product: maleic anhydride (58,968 mt/y).

St. Louis, Mo. Feed: butane. Product: maleic anhydride (18,144 mt/y).

Texas City, Tex. Feed: propylene. Products: acetic acid (226,799 mt/y), acrylonitrile (205,000 mt/y), methanol (158,100 mt/y).

NEW JERSEY ZINC CO.

Palmerton, Pa. Feed: natural gas. Product: ammonia (32,000 mt/y).

NIPRO INC.

(DSM subsidiary)

Augusta, Ga. Feed: cyclohexane. Product: caprolactam (165,000 mt/y).

NORTHERN PETROCHEMICAL CO.

Clinton, Iowa. Feed: ethane, propane. Products: butadiene (17,306 mt/y), ethylene (364,569 mt/y), ld polyethylene (188,913 mt/y), hd polyethylene (157,428 mt/y), propylene (13,872 mt/y).

Morris, Ill. Feed: ethane, propane. Products: butadiene (14,500 mt/y), ethylene (430,000 mt/y), ethylene glycol (106,000 mt/y), ethylene oxide (40,900 mt/y), ld polyethylene (370,000 mt/y), polypropylene (110,000 mt/y), propylene (110,000 mt/y).

N-REN CORP.

Carlsbad, N.M. Feed: natural gas. Product: ammonia (70,000 mt/y).

East Dubuque, Ill. Feed: natural gas. Products: ammonia (250,000 mt/y).

Pine Bend, Minn. Feed: natural gas. Product: ammonia (27,000 mt/y).

Pryor, Okla. Feed: natural gas. Products: ammonia (75,000 mt/y).

NUODEX INC.

Chestertown, Md. Feed: alcohols, phthalic anhydride. Product: plasticizers (36,000 mt/y).

OCCIDENTAL CHEMICAL CO.

Addis, La. Feed: vinyl chloride. Product: polyvinyl chloride (133,000 mt/y).

Burlington, N.Y. Feed: vinyl chloride. Product: polyvinyl chloride (72,000 mt/y).

Perryville, Md. Feed: vinyl chloride. Product: polyvinyl chloride (108,000 mt/y).

Pottstown, Pa. Feed: vinyl chloride. Product: polyvinyl chloride (94,000 mt/y).

OKLAHOMA NITROGEN CO.

(62.5% W.R. Grace, 37.5% Terra Chemicals)

Woodward, Okla. Feed: natural gas. Product: ammonia (408,200 mt/y).

OLIN CORP.

Brandenberg, Ky. Feed: ethane. Products: ethylene (50,000 mt/y), ethylene oxide (50,000 mt/y), propylene glycol (22,500 mt/y).

Lake Charles, La. Feed: natural gas. Products: ammonia (480,000 mt/y), urea (214,000 mt/y).

PD GLYCOL

Beaumont, Tex. Feed: ethylene. Products: ethylene glycol (269,000 mt/y), ethylene oxide (207,000 mt/y).

PHILLIPS CHEMICAL CO.

Beatrice, Neb. Feed: natural gas. Product: ammonia (204,000 mt/y).

Borger, Tex. Feed: aromatic oils. Products: carbon black (125,000 mt/y).

Kennewick, Wash. Feed: natural gas. Product: ammonia (127,000 mt/y).

Orange, Tex. Feed: aromatic oil. Product: carbon black (61,000 mt/y).

Pasadena, Tex. Feed: butadiene, ethylene, propylene, styrene. Products: hd polyethylene (626,000 mt/y), polypropylene (109,000 mt/y), resins (68,000 mt/y).

Sweeny, Tex. Feed: benzene, crude oil, natural gas liquids. Products: aromatics mix (275,000 mt/y), cyclohexane (262,000 mt/y), ethylene (1,143,000 mt/y), propylene (255,000 mt/y).

POLYSAR INC.

Chattanooga, Tenn. Feed: butadiene, styrene. Product: SBR, latex (70,000 mt/y).

Copley, Ohio. Feed: styrene. Product: polystyrene (70,000 mt/y).

Forest City, N.C. Feed: styrene. Product: polystyrene (18,000 mt/y).

Leominster, Mass. Feed: styrene. Product: polystyrene (70,000 mt/y).

Monaca, Pa. Product: SBR, latex (22,000 mt/y).

Orange, Tex. Feed: butadiene. Product: butadiene rubber (70,000 mt/y).

PPG INDUSTRIES

Lake Charles, La. Feed: ethylene. Products: ethylchloride (56,000 mt/y), ethylene dichloride (500,000 mt/y), vinyl chloride (230,000 mt/y).

REICHHOLD CHEMICAL INC.

Hampton, S.C. Feed: methanol. Product: formaldehyde.

Houston, Tex. Feed: methanol. Product: formaldehyde.

Kansas City, Kans. Product: formaldehyde.

Tacoma, Wash. Product: formaldehyde.

ROHM AND HAAS CO.

Bayport, Tex; Bristol and Croydon, Pa; Calumet City, Ill; Fayetteville, N.C.; Hayward, Calif; Louisville, Ky. Products: acrylics, acrylic acid and esters, plasticizers, polyester, polyethylene, specialty acrylic monomers.

Deer Park, Texas. Feed: natural gas, propylene. Products: acrylic acid and esters (280,000 mt/y).

RUBICON INC.

Geismar, La. Feed: benzene. Product: aniline (136,000 mt/y).

SHELL CHEMICAL CO.

Deer Park, Tex. Feed: natural gas liquids, petroleum fractions. Products: benzene (501,000 mt/y), bisphenol A (159,000 mt/y), butadiene (227,000 mt/y), ethylene (1,316,000 mt/y), isoprene concentrate (45,000 mt/y), isopropanol (408,000 mt/y), normal paraffins (100,000 mt/y), orthoxylene (57,000 mt/y), phenol (227,000 mt/y), propylene (771,000 mt/y), resins (91,000 mt/y), toluene (199,000 mt/y), vinyl chloride (381,000 mt/y), xylene mix (181,000 mt/y).

Geismar, La. Feed: ethylene. Products: linear C_4 - olefins (340,000 mt/y), ethylene glycol (227,000 mt/y), ethylene oxide (363,000 mt/y), glycol ethers (25,000 mt/y).

Marietta, Ohio. Product: thermoplastic rubber (170,000 mt/y).

Norco, La. Feed: natural gas liquids, petroleum fractions. Products: butadiene (227,000 mt/y), polypropylene (136,000 mt/y).

Taft, La. Product: polybutylene (27,000 mt/y).

Wilmington, Calif. Products: propylene (50,000 mt/y).

Woodbury, N.J. Product: polypropylene (147,000 mt/y).

Wood River, Ill. Products: benzene (166,000 mt/y), isopropyl alcohol (154,000 mt/y), propylene (113,000 mt/y).

SHINTECH INC.

Freeport, Tex. Feed: vinyl chloride monomer. Product: polyvinyl chloride (325,000 mt/y).

SID RICHARDSON CARBON CO.

Addis, La. Feed: heavy oil and natural gas. Product: carbon black (55,792 mt/y).

Big Spring, Tex. Feed: heavy oil and natural gas. Product: carbon black (48,988 mt/y).

SIMPLOT & CO., J.R.

Pocatello, Idaho. Feed: natural gas. Product: ammonia (275 mt/d).

SOHIO CHEMICAL CO.

Green Lake, Tex. Feed: ammonia, propylene. Product: acrylonitrile (270,000 mt/y).

Lima, Ohio. Feed: ammonia, natural gas, propylene. Products: acrylics (8,400 mt/y), acrylonitrile (330,000 mt/y), ammonia (1,360 mt/d), urea (1,300 mt/d).

SOLTEX POLYMER CORP.

(subsidiary of Solvay & Cie.)

Deer Park, Tex. Feed: ethylene, propylene. Product: hd polyethylene, polypropylene.

STANDARD OIL COMPANY (OHIO)

Lima, Ohio. Feed: refinery gases. Product: propylene (430 mt/d).

STEPAN CHEMICAL CO.

Joliet, Ill. Feed: orthoxylene. Product: phthalic anhydride (77,000 mt/y).

SUN CI

Marcus Hook, Pa. Feed: crude, gas oil, naphtha. Products: benzene (48,000 mt/y), propylene (184,000 mt/y), toluene (120,000 mt/y), xylene mix (82,000 mt/y).

Toledo, Ohio. Feed: crude. Products: benzene (83,500 mt/y), toluene (214,000 mt/y), xylene mix (147,600 mt/y).

Tulsa, Okla. Feed: crude. Products: benzene (5,000 mt/y), cyclohexane (81,000 mt/y), toluene (10,000 mt/y).

SUNOLIN CHEMICAL CO.

Claymont, Del. Feed: refinery dry gas, oxygen. Products: ethylene (108,863 mt/y), ethylene oxide (45,352 mt/y).

TENNECO OIL CO.

Chalmette, La. Feed: crude oil. Products: benzene (51,000 mt/y), orthoxylene (69,500 mt/y), paraxylene (68,500 mt/y), toluene (108,500 mt/y), xylene mix (13,900 mt/y), solvents (53,000 mt/y).

TENNECO POLYMERS INC.

Burlington, N.J. Feed: vinyl chloride. Product: polyvinyl chloride (48,000 mt/y).

Flemington, N.J. Feed: vinyl chloride. Product: polyvinyl chloride (45,000 mt/y).

Pasadena, Tex. Feed: vinyl chloride. Products: polyvinyl chloride (325,000 mt/y).

TENNESSEE VALLEY AUTHORITY

Muscle Shoals, Ala. Feed: natural gas. Products: ammonia (200 mt/d), urea (300 mt/d).

TENN-USS CHEMICALS CO.

(Tenneco and U.S. Steel joint venture)

Pasadena, Texas. Feed: orthoxylene, propylene. Product: phthalic anhydride (95,238 mt/y), 2-ethyl hexanol (86,168 mt/y).

TERRA CHEMICALS INTERNATIONAL INC.

Sioux City (Port Neal), Iowa. Feed: natural gas. Products: ammonia (605 mt/d), urea (700 mt/d).

TEXACO CHEMICAL CO.

Delaware City, Del. Feed: naphtha fractions, natural gas. Products: benzene, methanol (300,000 mt/y), naphthalene (45,000 mt/y), toluene.

El Dorado, Kans. Feed: naptha fractions. Products: acetone (25,000 mt/y), phenol (43,000 mt/y).

Port Arthur, Tex. Feed: naphtha fractions, NGL. Products: benzene (165,000 mt/y), cyclohexane (200,000 mt/y), ethylene (450,000 mt/y), propylene (225,000 mt/y), toluene (95,000 mt/y).

Port Neches, Tex. Feed: ethylene, NGL. Products: butadiene (225,000 mt/y), ethylene (170,000 mt/y), ethylene glycol (235,000 mt/y), ethylene oxide (300,000 mt/y), propylene glycol (25,000 mt/y).

Texas City, Tex. Product: propylene (73,000 mt/y).

TEXAS CITY REFINING INC.

Texas City, Tex. Feed: refinery streams. Products: propylene (73,000 mt/y).

TEXAS EASTMAN CO.

Harrison County, Tex. Feed: ethane, naphtha, propane. Products: acetaldehyde (215,000 mt/y), aromatics mix (100,680 mt/y), butanol (100,000 mt/y), butylenes-butadiene mix (50,000 mt/y), butyraldehyde (300,000 mt/y), ethanol (80,000 mt/y), ethylene (611,400 mt/y), ethylene glycol (85,000 mt/y), ethylene oxide (90,000 mt/y), oxoalcohols (223,000 mt/y), ld polyethylene (285,000 mt/y), polypropylene (70,000 mt/y), ld polyethylene (285,000 mt/y), propylene (284,000 mt/y), solvents (200,000 mt/y).

TENN-USS CHEMICALS CO.

(100% USS Chemicals)

Pasadena, Tex. Product: phthalic anhydride (95,255 mt/y).

TEXAS PETROCHEMICAL CORP.

(subsidiary of Texas Olefins Co.)

Houston, Tex. Feed: mixed C_4 olefins, diolefins. Products: butadiene (350,000 mt/y), butene 1 (90,000 mt/y), disobutylene (30,000 mt/y), MTBE (280,000 mt/y).

TRIAD CHEMICAL CO.

(joint venture Mississippi Chemical and First Mississippi Corp.)

Donaldsonville, La. Feed: natural gas. Products: ammonia (1,000 mt/y), urea (1,200 mt/y).

UNION CARBIDE CORP.

Bound Brook, N.J. Feed: cumene, petroleum derived feedstocks, derivatives. Products: acetone (50,000 mt/y), formaldehyde (45,000 mt/y), phenol (80,000 mt/y), polystyrene.

Institute, W. Va. Feed: natural gas (LP-gas), naphthalene. Products: acetaldehyde, acetone, alkylbenzene, plasticizers.

Seadrift, Tex. Feed: ethane, propane. Products: acetylene (9,000 mt y), butadiene, ethylbenzene (170,000 mt y), ethylene (562,300 mt y), ethylene glycol, ethylene oxide, oxoalcohols, ld polyethlene (362,874 mt y), ld polyethylene (225,000 mt y), lld polyethylene (308,000 mt y), propylene, styrene (136,000 mt y), solvents.

South Charleston, West Va. Feed: natural gas, refinery liquids, crude oil, petroleum fractions. Products: solvents, plasticizers.

Taft, La. Feed: ethane, propane, butane, paraffinate, naphtha. Products: acetic acid, acetylene (5,000 mt y), acrylic acid and acrylic esters (90,000 mt y), benzene (230 mt y), butadiene, ethylene (498,900 mt y), ethylene dichloride (70,000 mt y), ethylene glycol, ethylene oxide, lld-hdpolyethylene (327,273 mt y), propylene.

Texas City, Tex. and Ponce, Puerto Rico. Feed: butadiene, ethylene, propylene. Products: acetylene (63,000 mt y), butanol (168,000 mt y), butyraldehyde (195,000 mt y), ethanol (339,000 mt y), ethylene—Ponce (412,700 mt y), ethylene—Texas City (702,300 mt y), isopropanol (349,000 mt y).

UNOCAL CORP.

Beaumont, Tex. Feed: reformate. Products: benzene (92,500 mt y), cyclohexane (89,000 mt y), toluene (26,300 mt y), xylene mix (135,900 mt y).

Brea, Calif. Feed: natural gas. Products: ammonia (220,000 mt y), urea (100,000 mt y).

Bridgeview and Lemont, Ill. Product: polymers (58,287 mt y).

Charlotte, N.C. Product: polymers (178,400 mt y).

La Mirada and Newark, Calif. Products: polymers (63,640 mt y).

Lemont, Ill. Feed: reformate, primary light oil. Products: benzene (52,300 mt y), toluene (51,500 mt y), xylene mix (33,000 mt y).

Kenai, Alaska. Feed: natural gas. Products: ammonia (1,000,000 mt y), urea (900,000 mt y).

UNIROYAL CHEMICAL CO.

Geismar, La. Feed: ethylene, propylene. Product: ethylene-propylene rubber (44,000 mt y).

Port Neches. Product: SBR (164,000 mt y).

U.S. INDUSTRIAL CHEMICALS CO.

Houston, Texas. Feed: ethylene. Products: acetic acid (272,156 mt y), ld polyethylene (207,000 mt y), hd polyethylene (250,000 mt y), vinyl acetate (270,000 mt y).

Port Arthur, Texas. Feed: ethylene. Products: ld polyethylene (86,000 mt y), hd polyethylene (155,000 mt y).

Tuscola, Illinois. Feed: ethylene. Products: ethanol (198,000 mt y), ld polyethylene (77,000 mt y).

USS AGRI-CHEMICALS

(Division of U.S. Steel Corp.)

Cherokee, Alabama. Feed: natural gas. Products: ammonia (175,000 mt y).

USS CHEMICALS

(Division of U.S. Steel Corp.)

Bartow, Fla., Colton, Calif., Jacksonville, Ark., Linden, N.J. Feed: Dibasic acids, alcohols, glycols, styrene. Product: polyester resins (68,400 mt y).

Haverhill, Ohio. Feed: ammonia, cumene. Products: acetone (141,151 mt y), benzene (144,320 mt y), bisphenol A (54,432 mt y), phenol (235,870 mt y).

Houston, Texas. Feed: LPG, refinery offgas. Products: acrylics (17,237 mt y), ethylene (226,799 mt y), polypropylene (233,602 mt y), propylene (63,504 mt y), styrene (54,432 mt y), toluene (29,405 mt y), xylene mix (6,675 mt y).

LaPorte, Tex. Feed: propylene. Product: polypropylene (138,800 mt y).

Neal, West Va. Feed: propylene. Product: polypropylene (74,800 mt y).

Neville Island, Pa. Feed: butane, glycols, styrene. Products: maleic anhydride (27,700 mt y), polyester (40,800 mt y), plasticizers (104,327 mt y).

VELSICOL CHEMICAL CORP.

Chattanooga, Tenn. Feed: benzoic acid, dipropylene glycol, diethylene glycol, propylene glycol. Product: plasticizers (12,700 mt y).

VISTA CHEMICAL CO.

Aberdeen, Miss. and Oklahoma City, Okla. Feed: vinyl chloride monomer. Product: polyvinyl chloride (339,000 mt y).

Baltimore, Md. Feed: benzene, n-paraffins. Products: alkylbenzene (102,000 mt y).
y)

West Lake, La. Feed: benzene, ethane, kerosine. Products: alkylbenzene (68,000 mt y), aromatics (7,600 mt y), butadiene (14,500 mt y), ethylene (295,000 mt y), linear alcohols (107,000 mt y), n-paraffins (150,000 mt y), propylene (7,720 mt y), vinyl chloride (305,000 mt y).

VULCAN MATERIALS CO.

Geismar, La. Feed: ethylene. Product: ethylene dichloride (150,000 mt y).

URUGUAY

ITALCOLOR SA

San Jose. Feed: methanol. Products: formaldehyde (7,200 mt y).

VENEZUELA

ESTIZULIA—Estireno del Zulia

(Pequiven, Grupo Zuliano, Dart Industries)

El Tablazo. Feed: styrene. Products: polystyrene (40,000 mt y).

INTEQUIM—Quimica Integrada

Valencia. Products: acrylics (7,800 mt y), alkyds (8,000 mt y), formaldehyde (7,400 mt y), polyester (5,600 mt y).

NEGROVEN

Valencia. Feed: aromatic oil. Product: carbon black (40,000 mt y).

NITROVEN—Venezolana del Nitrogeno

(Pequiven, Instituto Fomento Industrial)

El Tablazo. Feed: natural gas. Products: ammonia (594,000 mt y-two units), urea (792,000 mt y-two units).

OXIDOR—Oxidaciones Orgánicas

(Pequiven, Conmon, Invequimica)

Valencia, Edo. Carabobo. Feed: orthoxylene. Product: phthalic anhydride (17,000 mt y).

PEQUIVEN—Petroquimica de Venezuela.

El Tablazo. Feed: natural gas. Products: ammonia (1,800 mt d), ethylene (455 mt d), ethylene dichloride (240 mt d), ld polyethylene (178 mt d), hd polyethylene (182 mt d), polyvinyl chloride (121 mt d), propylene (136 mt d), urea (2,400 mt d), vinyl chloride (145 mt d).

Moron, Edo Carabobo. Feed: natural gas. Products: ammonia (600 mt d), urea (750 mt d).

PETROPLAS—Plasticos Petroquimica

(100% Pequiven)

El Tablazo. Feed: chlorine, ethylene. Products: ethylene dichloride (79,000 mt y), polyvinyl chloride (40,000 mt y), vinyl chloride (48,000 mt y).

PLASTILAGO—Plasticos del Lago

(Pequiven, Grupo Zuliano, CdF Chimie, Mitsui)

El Tablazo. Feed: ethylene. Product: hd polyethylene (60,000 mt y).

POLILAGO—Polimeros del Lago.

(Pequiven, Grupo Zuliano, 30% Cdf Chimie)

El Tablazo. Feed: ethylene. Product: ld polyethylene (58,500 mt y).

QUIMICA VENOCO

(Industrias Venoco, Pequiven, Phillips Invest. Co., Shell Qumica de Venezuela)

El Tablazo and Guacara. Feed: benzene-propylene. Products: alkylbenzene (18,000 mt y).

VIRGIN ISLANDS

ST CROIX PETROCHEMICAL CORP.

(joint venture Amerada Hess Corp. and Hercofina)

St. Croix. Feed: mixed xylenes. Product: paraxylene (275,000 mt y).

YUGOSLAVIA

DOW CHEMICAL CO.

Zagreb. Product: polystyrene.

MIDYEAR FORECAST & REVIEW

Worldwide first-half production slips

Country	First half 1985*	First half 1984	Change	Country	First half 1985*	First half 1984	Change
	1,000 b/d		(%)		1,000 b/d		(%)
WESTERN HEMISPHERE				**MIDDLE EAST**			
Argentina	449	474	− 5.27	Bahrain	42	42	—
Bolivia	23	21	− 4.76	Iran	2,300	2,164	+ 6.28
Brazil	523	433	+20.79	Iraq	1,300	1,152	+12.65
Canada	1,448	1,400	+ 3.43	Israel	1	1	—
Chile	35	40	−12.50	Kuwait	858	983	−12.72
Colombia	170	164	+ 3.66	Divided Zone†	440	454	− 3.08
Ecuador	277	253	+ 9.49	Oman	463	409	+13.20
Guatemala	3	5	−40.00	Qatar	296	418	−29.19
Mexico	2,767	2,787	− 0.72	Saudi Arabia	3,550	4,951	−28.30
Peru	190	182	+ 4.40	Syria	175	170	+ 2.94
Trinidad	178	163	+ 9.20	United Arab Emirates	1,100	1,218	− 9.69
U.S.	8,895	8,811	+ 0.95	**Total**	**10,525**	**11,982**	**−12.01**
Venezuela	1,633	1,721	− 5.11	**AFRICA**			
Total	**16,588**	**16,454**	**+ 0.81**	Algeria	655	617	+ 6.16
WESTERN EUROPE				Angola-Cabinda	210	201	+ 4.48
Austria	21	24	−12.50	Cameroon	133	129	+ 3.10
Denmark	57	43	+32.56	Congo	90	90	—
France	40	35	+14.29	Egypt	916	730	+25.48
West Germany	82	79	+ 3.80	Gabon	150	150	—
Greece	27	27	—	Ghana	2	2	—
Italy	37	45	−17.78	Ivory Coast	28	27	+ 3.70
Netherlands	59	61	− 3.28	Libya	1,067	1,167	− 8.57
Norway	742	664	+11.75	Morocco	1	1	—
Spain	51	53	− 3.77	Nigeria	1,597	1,413	+13.02
Turkey	40	42	− 4.76	Tunisia	125	120	+ 4.17
U.K.	2,640	2,479	+ 6.49	Zaire	25	27	− 7.41
Total	**3,796**	**3,552**	**+ 6.87**	**Total**	**4,999**	**4,674**	**+ 6.95**
ASIA-PACIFIC				**Total Non-Communist**	**39,104**	**39,652**	**− 1.38**
Australia	540	483	+11.80	**COMMUNIST**			
Brunei	160	160	—	China	2,390	2,210	+ 8.14
Burma	30	30	—	Romania	250	255	− 1.96
India	600	487	+23.20	U.S.S.R.	11,923	12,314	− 3.18
Indonesia	1,301	1,380	− 5.72	Other	236	235	+ 0.43
Japan	10	8	+25.00	**Total**	**14,799**	**15,014**	**− 1.43**
Malaysia	465	405	+14.81	**World Total**	**53,903**	**54,666**	**− 1.40**
New Zealand	17	17	—				
Pakistan	27	14	+92.86				
Philippines	13	11	+18.18				
Taiwan	3	3	—				
Thailand	30	12	+150.0				
Total	**3,196**	**3,010**	**+ 6.18**				

*Estimated. †Shared by Saudi Arabia and Kuwait.

OGJ's full-year forecast of supply and demand

	First half 1985		Third quarter 1985		Fourth quarter 1985		Year 1985	
	Volume (1,000 b/d)	Change from '84 (%)	Volume (1,000 b/d)	Change from '84 (%)	Volume (1,000 b/d)	Change from '84 (%)	Volume (1,000 b/d)	Change from '84 (%)
DOMESTIC DEMAND								
Motor gasoline	6,730	+1.8	6,995	+2.0	6,745	+0.6	6,800	+1.5
Dist. 1-4	5,625	+1.7	5,850	+2.0	5,620	+0.2	5,680	+1.3
Dist. 5	1,105	+2.3	1,145	+1.8	1,125	+3.2	1,120	+2.8
Naphtha jet	215	+0.2	225	-5.9	225	+5.6	220	—
Dist. 1-4	155	-1.9	165	-7.3	165	+7.8	160	-0.6
Dist. 5	60	+5.3	60	-3.2	60	—	60	+1.7
Kerosine jet	935	+2.1	1,000	+2.6	1,010	+2.1	970	+2.2
Dist. 1-4	680	+2.0	730	+6.3	730	-1.4	705	+2.2
Dist. 5	255	+2.0	270	-6.2	280	+12.4	265	+2.3
Distillate	2,980	-0.4	2,710	+4.8	3,110	+10.3	2,945	+3.4
Dist. 1-4	2,605	-0.8	2,305	+5.0	2,705	+10.0	2,555	+3.2
Dist. 5	375	+2.7	405	+3.6	405	+11.9	390	+5.1
Residual	1,205	-20.7	1,150	-5.3	1,260	+4.4	1,205	-11.7
Dist. 1-4	970	-23.4	915	-6.5	1,005	+6.8	965	-13.3
Dist. 5	235	-7.3	235	-0.4	255	-4.1	240	-4.8
LPG and ethane	1,605	+1.6	1,445	-2.8	1,745	+5.4	1,600	+1.6
Dist. 1-4	1,560	+2.0	1,405	-2.9	1,695	+5.5	1,555	+1.8
Dist. 5	45	-10.0	40	+2.6	50	—	45	-4.3
Misc. products	1,920	-3.0	2,315	+0.5	2,045	+5.5	2,050	—
Dist. 1-4	1,595	-3.7	1,960	+0.5	1,750	+6.3	1,725	-0.2
Dist. 5	325	+0.6	355	+0.6	295	+1.0	325	+0.6
TOTAL DOMESTIC DEMAND	**15,590**	**-1.4**	**15,840**	**+1.1**	**16,140**	**+3.9**	**15,790**	**+0.5**
Dist. 1-4	13,190	-1.8	13,330	+1.2	13,670	+3.8	13,345	+0.3
Dist. 5	2,400	+0.9	2,510	+0.6	2,470	+4.8	2,445	+1.8
EXPORTS	**775**	**+8.5**	**685**	**+6.4**	**705**	**-13.3**	**735**	**+1.9**
Dist. 1-4	345	+12.0	285	+13.1	305	-27.9	320	-0.9
Dist. 5	430	+6.0	400	+2.0	400	+2.6	415	+4.3
TOTAL DEMAND	**16,365**	**-1.0**	**16,525**	**+1.3**	**16,845**	**+3.1**	**16,525**	**+0.6**
Dist. 1-4	13,535	-1.5	13,615	+1.4	13,975	+2.8	13,665	+0.3
Dist. 5	2,830	+1.7	2,910	+0.8	2,870	+4.5	2,860	+2.1
SUPPLY								
Crude & lease cond.	8,895	+1.0	8,880	+0.2	8,870	-0.3	8,885	+0.5
Dist. 1-4	5,940	-0.7	5,935	-1.4	5,925	-1.5	5,935	-1.1
Dist. 5	2,955	+4.4	2,945	+3.7	2,945	+2.2	2,950	+3.7
NGL and other hydrocarbons	1,680	+2.6	1,670	-1.3	1,690	-2.6	1,680	+0.3
Dist. 1-4	1,635	+2.5	1,625	-1.2	1,645	-2.4	1,635	+0.3
Dist. 5	45	+7.1	45	-4.3	45	-8.2	45	—
IMPORTS								
Crude	2,890	-8.9	3,620	+11.1	3,500	+5.6	3,225	-0.1
Dist. 1-4	2,675	-10.0	3,405	+11.6	3,285	+5.7	3,010	-0.5
Dist. 5	215	+7.5	215	+4.9	215	+3.9	215	+5.9
Products & unfinished oils	1,830	-12.8	1,935	+4.3	2,005	+1.2	1,900	-5.4
Dist. 1-4	1,720	-13.5	1,825	+4.9	1,895	+1.1	1,790	-5.7
Dist. 5	110	—	110	-5.2	110	+1.9	110	-0.9
Total imports	4,720	-10.5	5,555	+8.6	5,505	+3.9	5,125	-2.2
Dist. 1-4	4,395	-11.4	5,230	+9.1	5,180	+4.0	4,800	-2.5
Dist. 5	325	+4.8	325	+1.2	325	+1.9	325	+3.5
Processing gain, loss, etc.	660	-27.8	750	+17.6	730	+18.1	700	-9.2
Dist. 1-4	565	-28.6	635	+21.4	615	+22.3	595	-8.7
Dist. 5	95	-22.8	115	—	115	—	105	-11.8
TOTAL NEW SUPPLY	**15,955**	**-4.1**	**16,855**	**+3.4**	**16,795**	**+1.5**	**16,390**	**-0.8**
Dist. 1-4	12,535	-6.0	13,425	+3.4	13,365	+1.4	12,965	-1.8
Dist. 5	3,420	+3.5	3,430	+3.2	3,430	+2.1	3,425	+3.1
STOCK CHANGE	**-410**	—	**+330**	—	**-50**	—	**-135**	—
Dist. 1-4	-1,000	—	-190	—	-610	—	-700	—
Dist. 5	+590	—	+520	—	+560	—	+565	—
CRUDE RUNS TO STILLS	**11,645**	**-3.0**	**12,495**	**+1.8**	**12,215**	**+2.3**	**12,000**	**-0.4**
TOTAL INPUT TO STILLS	**11,925**	**-2.0**	**12,795**	**+2.8**	**12,515**	**+2.5**	**12,290**	**-0.4**
TOTAL REFINERY CAPACITY	**15,530**	**-3.6**	**15,510**	**-3.3**	**15,510**	**-2.2**	**15,520**	**-3.2**
REFINERY UTILIZATION (%)	**76.8**	—	**82.5**	—	**80.7**	—	**79.2**	—
TOTAL INDUSTRY STOCKS*	**1,030**	**-5.4**	**1,060**	**-2.1**	**1,055**	**-4.5**	**1,055**	**-4.5**
Refined products	679	-7.7	710	-6.3	705	-7.4	705	-7.4
Crude	351	-0.5	350	+7.6	350	-1.9	350	+1.9
SPR stocks*	475	+14.7	485	+12.5	495	+9.8	495	+9.8

* Million bbl at end of period.

OGJ's revised drilling forecast for 1985—U.S. and Canada

State district, province	First half estimates				1985 forecast			
	Total comp.	Wildcats	Field wells	Total ft (1,000 ft)	Total comp.	Total wildcats	Field wells	Total ft (1,000)
Alabama	220	75	145	1,037	310	127	183	1,460
Alaska	152	25	127	1,374	335	35	300	3,029
Arizona	1	1	0	3	6	6	0	18
Arkansas	316	45	271	1,663	480	100	380	2,300
California	1,310	174	1,136	3,371	2,995	135	2,860	7,614
Onshore	1,256	160	1,096	3,065	2,900	100	2,800	7,076
Offshore	54	14	40	306	95	35	60	538
Colorado	900	340	560	5,230	1,575	500	1,075	9,152
Florida	20	4	16	273	60	25	35	820
Georgia	2	2	0	12	2	2	0	12
Idaho	3	3	0	19	8	8	0	74
Illinois	1,384	310	1,074	3,502	2,680	580	2,100	4,556
Indiana	400	60	340	760	620	130	490	868
Iowa	2	2	0	—	2	2	0	—
Kansas	2,200	600	1,600	7,641	6,580	1,600	4,980	16,450
Kentucky	1,200	160	1,040	1,840	2,750	300	2,450	2,475
Louisiana	2,886	395	2,491	15,702	5,160	780	4,380	26,100
North	1,888	125	1,763	5,200	3,250	250	3,000	7,400
South	583	190	393	6,394	1,190	290	900	11,900
Offshore	415	80	335	4,108	720	240	480	6,800
Michigan	718	330	388	2,965	1,475	710	765	5,100
Mississippi	321	170	151	2,820	520	240	280	4,569
Missouri	102	2	100	4	224	20	204	100
Montana	402	155	247	2,070	680	200	480	2,720
Nebraska	218	128	90	1,090	440	250	190	1,800
Nevada	28	22	6	169	55	30	25	332
New Mexico	862	177	685	4,837	1,905	330	1,575	10,673
East	539	97	442	3,111	1,150	160	990	6,638
West	323	80	243	1,726	755	170	585	4,035
New York	223	10	213	573	450	30	420	1,606
North Dakota	289	117	172	2,647	700	260	440	6,411
Ohio	2,745	50	2,695	10,033	4,000	105	3,895	14,620
Oklahoma	3,245	290	2,955	17,834	6,102	430	5,672	25,640
Oregon	7	4	3	24	16	8	8	55
Pennsylvania	1,369	30	1,339	3,092	1,800	60	1,740	4,066
South Carolina	1	1	0	13	1	1	0	13
South Dakota	40	16	24	244	61	31	30	372
Tennessee	404	114	290	609	650	300	350	1,014
Texas	11,808	2,282	9,526	63,016	27,275	4,535	22,740	132,969
District 1	1,209	73	1,136	3,022	2,390	190	2,200	5,975
District 2	440	169	271	2,930	775	300	475	4,800
District 3	1,164	250	914	8,885	2,020	420	1,600	14,400
District 4	778	330	448	5,894	1,290	480	810	9,000
District 5	359	87	272	2,028	540	140	400	3,050
District 6	692	147	545	5,012	1,080	200	880	7,822
District 7-B	1,400	300	1,100	4,912	4,700	1,200	3,500	13,630
District 7-C	967	186	781	6,514	2,675	285	2,390	18,018
District 8	1,593	133	1,460	8,158	4,200	220	3,980	21,508
District 8-A	873	194	679	5,326	2,125	275	1,850	12,965
District 9	1,600	307	1,293	6,166	4,000	600	3,400	13,200
District 10	608	46	562	2,957	1,190	85	1,105	5,788
Offshore	125	60	65	1,212	290	140	150	2,813
Utah	336	80	256	2,218	560	170	390	3,696
Virginia	25	5	20	135	50	5	45	275
Washington	2	2	0	—	2	2	0	—
West Virginia	1,013	15	998	4,603	1,650	40	1,610	7,323
Wyoming	1,004	345	659	7,138	1,750	600	1,150	12,443
Total U.S.	**36,158**	**6,541**	**29,617**	**168,581**	**73,929**	**12,687**	**61,242**	**310,725**
Western Canada	**4,782**	**1,735**	**3,047**	**18,222**	**9,788**	**3,753**	**6,035**	**37,179**
Alberta	3,202	1,400	1,802	13,243	6,500	2,800	3,700	26,884
British Columbia	153	13	140	597	270	60	210	1,054
Saskatchewan	1,332	300	1,032	4,019	2,810	825	1,985	8,478
Manitoba	58	16	42	170	140	50	90	409
Northwest-Arctic	37	6	31	193	68	18	50	354
East Coast Offshore	10	6	4	145	31	17	14	450

World official crude prices dropping

Country	Type of crude and API gravity	Current price ($/bbl)	Change 6-85/ 1-85 (%)	In effect Jan. 1, 1985 ($/bbl)	Change 85/84 (%)	In effect Jan. 1, 1984 ($/bbl)	In effect Jan. 1, 1983 ($/bbl)	In effect Jan. 1, 1982 ($/bbl)
OPEC								
Saudi Arabia	Arabian Light 34°	28.00	−3.4	29.00	—	29.00	34.00	34.00
Abu Dhabi	Murban 39°	28.15	−4.8	29.56	—	29.56	34.56	35.50
Algeria	Saharan 44°	29.50	−3.3	30.50	—	30.50	35.50	37.00
Nigeria	Bonny Light 37°	28.65	+2.3	28.00	−6.7	30.00	35.50	36.50
Libya	Es Sider 37°	30.15	—	30.15	—	30.15	35.10	36.50
Indonesia	Minas 34°	28.53	−3.4	29.53	—	29.53	34.53	35.00
Venezuela	Tia Juana 26°	27.60	−1.0	27.88	—	27.88	32.88	32.88
Total OPEC		**27.90**	**−2.2**	**28.51**	**−0.3**	**28.59**	**33.54**	**34.13**
U.K.	Brent blend 38°	26.65	−7.0	28.65	−4.2	29.90	33.50	36.50
Norway	Ekofisk 42°	27.50	−3.5	28.50	−5.8	30.25	34.25	37.25
Mexico	Isthmus 33°	27.75	− 4.3	29.00	—	29.00	32.50	35.00
U.S.S.R.	Export blend 33°	26.00	−7.1	28.00	−2.1	28.60	31.20	35.49
Total world		**27.35**	**−3.6**	**28.38**	**−0.8**	**28.61**	**33.00**	**34.18**
U.S.†		23.50	−3.2	24.28	−6.0	25.94	27.22	30.87

*Official sales price or estimated term contract prices. †U.S. crude wellhead price.
Source: DOE

Prices falling

	Refiner's acquisition cost of crude oil ($/bbl)	Motor gasoline retail* (¢/gal)	Residential heating oil (¢/gal)
1976	10.89	59.5	40.6
1977	11.96	63.1	46.0
1978	12.46	65.2	49.4
1979	17.72	88.2	65.6
1980	28.07	122.1	97.8
1981	35.24	135.3	120.5
1982	31.87	128.1	118.6
1983	28.99	122.5	107.8
1984	28.63	119.8	109.1
1985†	26.80	116.3	102.5
Rates of change (%/year)			
1976-81	+26.5	+17.8	+24.3
1981-85	− 6.6	− 3.7	− 4.0

*Average all types. †First half estimate.
Source: 1976-1984, DOE; 1985, OGJ estimate

U.S. uses more energy but improves efficiency

Year	GNP (Billion 1972 $)	Energy consumption (Trillion BTU)	Energy consumption/ GNP dollar (1,000 BTU)	Oil consumption (Trillion BTU)	Oil consumption/ GNP dollar (1,000 BTU)
1929	315	23,756	75.4	5,521	17.5
1933	222	16,900	76.1	4,833	21.8
1940	343	23,589	68.8	7,407	21.6
1946	477	30,494	63.9	10,002	21.0
1950	534	33,922	63.5	13,489	25.3
1955	655	39,703	60.6	17,524	26.8
1960	737	44,569	60.5	20,067	27.2
1965	926	53,343	57.6	23,242	25.1
1970	1,075	67,143	62.5	29,537	27.5
1971	1,108	68,348	61.7	30,570	27.6
1972	1,171	71,643	61.2	32,966	28.2
1973	1,254	74,212	59.2	34,840	27.8
1974	1,246	72,479	58.2	33,455	26.8
1975	1,232	70,485	57.2	32,731	26.6
1976	1,298	74,297	57.2	35,175	27.1
1977	1,370	76,215	55.6	37,122	27.1
1978	1,439	78,039	54.2	37,965	26.4
1979	1,479	78,845	53.3	37,123	25.1
1980	1,475	75,900	51.5	34,202	23.2
1981	1,514	73,940	48.8	31,931	21.1
1982	1,485	70,822	47.7	30,232	20.4
1983	1,535	70,573	46.0	30,054	19.6
1984	1,639	73,723	45.0	31,004	18.9
1985*	1,683	75,120	44.6	31,160	18.5
Rates of change (%):					
1929-40	+ 8.9	− 0.7	− 8.8	+ 34.2	+23.4
1940-50	+ 55.7	+43.8	− 7.7	+ 82.1	+17.1
1950-70	+101.3	+97.9	− 1.6	+119.0	+ 8.7
1970-84	+ 47.9	+ 9.8	−28.0	+ 5.0	−31.3

*Estimate.
Source: 1929-1984, DOE; 1985, OGJ estimate

WORLDWIDE GAS PROCESSING

Ailleen Cantrell
Director of Editorial Surveys

Capacities as of January 1, 1985, and average production

		MMcfd		Production—1,000 gal/day (Average based on the past 12 months)								
Country	No. plants	Gas capacity	Gas through-put	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other	Total products
United States												
Alabama	5	182.0	128.4	....	175.9	20.7	130.8	....	13.9	61.9	....	403.2
Alaska	2	62.0	45.0	....	4.0	....	....	....	46.3	....	....	50.3
Arkansas	5	1,005.0	846.1	....	25.1	6.8	15.9	....	14.6	37.6	4.6	104.6
California	34	1,167.6	685.8	....	461.3	11.3	267.6	24.4	330.8	158.3	13.6	1,267.3
Colorado	43	876.2	507.3	....	129.8	0.8	52.8	14.6	819.5	50.9	16.8	1,085.2
Florida	3	934.0	720.0	66.5	124.1	27.2	55.8	....	....	80.3	....	353.9
Illinois	2	551.5	456.6	497.6	352.8	46.9	79.0	....	2.9	6.0	....	985.2
Kansas	27	5,124.0	3,099.0	247.8	711.6	71.1	283.9	11.8	985.2	167.7	1.1	2,480.2
Kentucky	2	916.0	671.8	....	....	....	....	....	....	....	440.9	440.9
Louisiana	97	22,983.5	12,810.8	1,144.0	1,096.9	330.3	404.6	23.6	7,037.3	627.9	588.9	11,253.5
Michigan	9	675.4	405.1	....	99.3	....	....	....	937.5	20.6	37.6	1,095.0
Mississippi	6	995.0	487.3	....	7.9	....	8.0	....	30.3	8.9	....	55.1
Montana	9	70.0	35.3	....	42.9	8.2	6.4	13.4	39.2	1.5	1.5	113.1
Nebraska	2	13.5	3.1	....	2.8	....	2.1	....	5.0	1.7	....	11.6
New Mexico	39	3,255.2	2,078.4	84.5	131.3	11.8	73.4	57.5	3,278.0	94.0	224.2	3,954.7
North Dakota	11	314.2	205.3	133.3	190.8	....	128.8	29.2	64.3	99.2	17.4	663.0
Oklahoma	110	4,884.9	3,031.7	186.1	430.6	109.2	194.9	464.3	4,364.2	209.8	284.8	6,243.9
Texas	399	21,071.0	12,527.3	2,910.6	3,294.6	384.4	1,543.0	814.7	13,140.6	1,829.1	2,721.5	26,638.5
Utah	11	521.5	268.3	....	128.6	....	30.7	....	173.3	45.0	....	377.6
West Virginia	6	416.0	291.9	213.3	126.1	21.1	40.8	59.5	253.6	1.5	....	715.9
Wyoming	39	1,815.2	1,169.7	....	322.6	6.6	213.9	113.8	688.5	271.8	184.4	1,801.6
Total U.S.	**861**	**67,833.7**	**40,474.2**	**5,483.7**	**7,859.0**	**1,056.4**	**3,532.4**	**1,626.8**	**32,225.0**	**3,773.7**	**4,537.3**	**60,094.3**

Country	No. plants	Gas capacity	Gas through-put	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other	Total products
Abu Dhabi	5	2,498.0	1,551.8	....	357.2	288.8	20.2	....	....	203.9	309.2	1,179.3
Algeria	4	5,335.2	4,268.2	....	....	....	....	632.8	....	....	5,449.2	6,082.0
Argentina	11	1,715.9	1,429.0	545.0	496.3	....	339.0	....	....	275.9	....	1,656.2
Australia	4	1,707.0	943.0	414.0	492.0	....	267.0	....	....	....	747.0	1,920.0
Austria	2	5.7	4.7	....	....	....	....	....	0.3	....	....	0.3
Bahrain	1	145.0	110.0	....	115.5	....	96.6	....	....	142.8	....	354.9
Bangladesh	8	460.0	80.0	....	....	....	....	....	....	1.3	14.9	16.2
Bolivia	2	474.0	380.0	....	....	....	....	....	32.6	....	....	32.6
Brazil	5	312.0	245.0	....	....	....	....	277.4	249.5	71.4	....	598.3
Brunei	2	998.0	843.0	....	12.5	....	....	....	81.3	220.6	....	314.4
Canada												
Alberta	360	19,856.9	10,989.0	3,814.7	2,002.3	141.9	1,077.1	727.9	4,080.9	2,775.6	178.0	14,798.4
British Columbia	10	1,791.4	834.6	0.6	42.6	14.3	42.1	....	....	92.2	....	191.8
Northwest Territories	2	196.0	11.9	....	....	....	....	....	....	....	....	....
Saskatchewan	13	157.5	85.5	39.2	....	....	....	....	81.6	....	22.4	143.2
Chile	2	470.0	430.0	....	209.0	....	132.0	....	28.0	83.0	....	452.0
China, Taiwan	4	271.0	127.5	42.3	40.7	1.3	24.1	....	3.1	21.0	....	132.5
Colombia	2	125.0	125.0	145.0	29.0	....	7.0	....	....	6.0	....	187.0
Denmark	1	405.0	150.0	....	....	....	....	....	....	....	....	....
Dominican Republic	1	....	....	....	....	....	....	....	....	....	277.2	277.2
Dubai	1	330.0	300.0	....	....	....	....	....	....	....	1,176.0	1,176.0
Ecuador	2	....	....	....	....	....	....	2.4	9.1	....	....	11.5
Egypt	7	826.0	764.0	....	0.2	0.2	0.2	232.9	....	0.1	694.7	928.3
France	1	900.0	867.0	....	160.0	....	165.0	....	....	415.0	....	740.0
Germany	5	542.9	451.0	....	....	....	....	....	....	....	....	....
Greece	2	39.0	37.0	....	....	....	....	....	83.0	....	....	83.0
Hungary	12	788.5	444.8	....	140.0	3.0	136.5	31.5	110.5	162.1	327.6	911.2
Indonesia	10	933.2	654.9	....	695.0	355.0	....	51.6	465.2	....	73.1	1,639.9
Italy	16	7,101.0	4,909.0	....	....	....	....	29.6	175.0	15.4	....	220.0
Kuwait	1	1,680.0	360.0	....	834.0	....	548.0	....	....	305.0	85.0	1,772.0
Libya	7	1,851.0	1,227.0	....	....	....	....	37.8	5,577.0	....	551.0	6,165.8
Malaysia	1	250.0	157.0	....	337.1	356.6	....	....	....	....	417.3	1,111.0
Mexico	9	3,807.0	3,467.0	3,154.4	7,525.4	....	....	....	....	....	....	10,679.8
Netherlands	1	440.0	350.0	....	....	....	....	....	6.0	....	....	6.0
New Zealand	1	96.0	59.0	....	23.6	....	3.2	....	....	7.9	....	34.7
Norway	1	350.0	79.6	....	....	....	....	....	160.0	....	....	160.0
Pakistan	5	950.0	810.9	....	....	....	....	47.0	....	7.6	7.8	62.4
Peru	3	70.0	27.1	....	....	....	0.6	5.7	....	20.0	1.8	28.1
Qatar	2	578.7	276.8	595.4	580.7	....	354.7	....	....	247.1	....	1,777.9
Saudi Arabia	5	4,300.0	....	....	....	....	....	....	1,176.0	....	....	1,176.0
Sharjah	1	500.0	600.0	....	....	....	....	....	2,436.0	....	....	2,436.0
United Kingdom	5	2,235.0	1,030.0	....	332.0	....	291.0	....	....	1,748.5	46.6	2,418.1
Venezuela	14	2,696.0	2,283.0	59.8	195.7	....	....	632.9	1,774.5	125.7	....	2,788.6
Total, outside U.S.	**551**	**68,187.9**	**41,763.3**	**8,810.4**	**14,620.8**	**1,161.1**	**3,504.3**	**2,709.5**	**16,529.6**	**6,948.1**	**10,378.8**	**64,662.6**

Company, plant, location	MMcfd Gas capacity	Gas throughput	Process method	Production—1,000 gal/day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
ALABAMA											
Exxon Co. USA—Big Escambia Creek, Escambia Co., 4-1n-7e	40.0	33.2	7		56.5		52.5			38.0	
Petro-Lewis Corp.—Womack, Choctaw Co., 9-10n-2w	4.0	2.7	3		6.8		6.6			4.9	
Phillips Petroleum Co.—Chatom, Washington Co., ne4-29-6n-4w	31.0	NR	3								
Texaco Inc.—Hatter's Pond, Mobile Co., 10-2s-1w	50.0	37.6	3		50.9	20.7	23.1			19.0	
Union Oil Co. of California—Chunchula, Mobile Co., 22-1s-2w	57.0	30.1	3		61.7		48.6		13.9		
Total	**182.0**	**128.4**		....	**175.9**	**20.7**	**130.8**	....	**13.9**	**61.9**	....
ALASKA											
Chevron USA Inc.—*Swanson River LTS, Kenai Borough, 4-7n-9w	30.0	28.0	3		4.0				12.0		
Marathon Oil Co.—Trading Bay, Kenai Borough, 5-18n-15w-51n	32.0	17.0	7						34.3		
Total	**62.0**	**45.0**		....	**4.0**	....	....	....	**46.3**	....	....
ARKANSAS											
Amoco Production Co.—*Chalybeat Springs, Columbia Co., 34-19s-19w	25.0	25.0	3						14.6		
Arkla Energy Resources—Hamilton, Columbia Co., se9-18s-21w	75.0	10.8	2		10.5	3.7	5.3			5.1	^{11}4.3
Cal Gas Corp.—*Walker Creek, Columbia Co., 24-19s-23w	30.0	27.3	2		7.6	3.1	4.6			11.3	^{11}0.3
Cities Service Co.—*Walker Creek, Columbia Co., 23-19s-23w	25.0	23.0	2		7.0		6.0			9.0	
Natural Gas Pipeline Co. of America—CP 370, White County	850.0	760.0	3							12.2	
Total	**1,005.0**	**846.1**		....	**25.1**	**6.8**	**15.9**	....	**14.6**	**37.6**	**4.6**
CALIFORNIA											
co Oil & Gas Co.—No. Coles Levee No. 8, Kern Co., 32-305-25e MDB&M	190.0	13.2	2		9.9	1.6	11.1			6.7	
Ojai Timber No. 18, Ventura Co., Rancho Ojai 36	7.4	3.0	2							0.6	
Chevron USA Inc.—Carpinteria, Santa Barbara Co., 33-4n-25w	23.0	10.6	3		0.5		4.0			2.2	
Huntington Beach, Orange Co., 3-6s-11w	3.5	2.1	3						3.4		
Inglewood LTS, Los Angeles Co., 8-25-14w	15.0	9.9	3						17.9		
Kettleman 3-P, Kings Co., 3-22s-17e	10.0	8.8	3		1.4	0.3	0.2		10.6		
Lost Hills, Kern Co., 4-27s-21e	10.0	0.6	3						0.4		
McKittrick Seventeen-Z, Kern Co., 17-30s-22e	60.0	56.6	2		54.9				56.5		
Murphy-Coyote, Orange Co., 18-3s-10w	5.0	1.5	3						2.4		
Race Track 32-Z, Kern Co., 32-30s-29e	7.0	0.6	3						1.0		
Taft 1-C LTS, Kern Co., 1-32s-23e	16.0	13.8	3		10.5		0.8		28.0		
Torrance, Los Angeles Co., 24-4s-14w	3.0	1.4	3						1.3		
Coastal Oil & Gas Corp.—Careaga Canyon, Santa Barbara Co., sw4 18-8n-33w	8.0	1.0	3								
Department of Energy—35R, Kern Co., 30s-23e-35-R	94.0	62.2	1		39.6		44.1		30.1		
LTS-1, Kern Co., 30s-23e-35R	100.0	114.4	3		87.5		79.1		59.6		
LTS-2, Kern Co., 30s-23e-35R	100.0	116.3	3		95.1		81.4		60.3		
Marathon Oil Co.—*South Coles Levee, Kern Co., 3-31s-25e	80.0	44.0	1		22.0	3.1	7.2			13.9	^{11}13.6
Petrolane Lomita Gasoline Co.—Harbor, Los Angeles Co.	40.0	17.0	4						4.5		
Signal Hill, Los Angeles Co.	14.0	7.0	3		2.8				24.0		
Phillips Petroleum Co.—Huntington Beach, Orange Co., 3-6s-11w	15.0	5.3	3						6.1		
Santa Fe Energy Co.—Rincon, Ventura Co., 17-3n-74w SBB&M	16.0	4.3	1		10.6		3.8			5.8	
Sun Exploration & Production Co.—Newhall, Los Angeles Co., 27-4n-17w	70.0	29.7	2		8.7				8.8		
Texaco Inc.—Buena Vista Hills, Kern Co., 8-32s-24e MDB&M	20.0	6.6	1		5.1					8.4	
Cymric, Kern Co., 26-29s-22e MDB&M	4.0	2.6	3							2.4	
Honor Rancho, Los Angeles Co., 36-5n-17w-SBBM	NR	0.3	3							0.3	
Lost Hills, Kern Co., 9-27s-21e	60.0	29.8	3		16.8					27.4	

To arrive at more accurate totals, natural-gas throughput and liquids production are estimated at 80% capacity in those cases where only capacities are available. This explains apparent discrepancies in the addition of some columns. The letters NR mean no response. *Indicates cycling operations. The symbol -- denotes less than 100 gal/day.

Products listed in the last column are identified by numbers: 1—isopentane, 2—upgraded motor fuel, 3—diesel, 4—kerosine, 5—ethane-propane mix, 6—solvent naphtha, 7—jet fuel, 8—normal pentane, 9—residuum, bottoms, 10—distillate, fuel oil, 11—condensate, 12—gas oil.

The process methods in the third column are identified by the following numbers: 1—absorption, 2—refrigerated absorption, 3—refrigeration, 4—compression, 5—adsorption, 6—cryogenic—Joule-Thomson, 7—cryogenic-expander.

Figures in parenthesis do not represent primary production, and are not added in state totals.

Since this compilation includes cycling plants reprocessing pipeline gas, totals shown here for gas throughput do not relate directly to government data on total gas processed, or sold. Similarly, liquids production figures are based on yearly average and do not necessarily reconcile with government data.

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Production—1,000 gal/day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Shiells Canyon, Ventura Co., 4-4n-19w-SBBM	18.0	8.4	2		7.0					13.2	
Ventura Co., 27-3n-23w SBB&M	20.0	15.7	2		26.0	6.3	13.3			16.3	
Union Oil Co. of California—*Coalinga Nose, Fresno Co., 7-20s-16e	70.0	56.3	7		37.8		11.7		. .	24.0	
Dominguez, Los Angeles Co., 33-3s-9w	3.0	2.6	3					4.9			
Santa Clara Valley, Ventura Co., 4n-18w	17.0	12.7	7		. .			19.5	8.9		
Santa Maria, Santa Barbara, 24-10n-34w	35.0	13.8	1		17.7		10.9			13.2	
Stearns, Orange Co., 7-3s-9w	20.0	5.7	1		7.4					23.9	
Warren Petroleum Co.—Lost Hills, Kern Co., se4 32-26s-21e	NR	8.0	2						7.0		
Total	**1,167.6**	**685.8**		. . . .	**461.3**	**11.3**	**267.6**	**24.4**	**330.8**	**158.3**	**13.6**

COLORADO

Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Amoco Production Co.—Peoria, Arapahoe Co., 33-4s-60w	12.0	4.8	7		12.1				13.0		[11]0.6
Spindle, Weld Co., 34-2n-67w	37.0	21.5	7						116.2		[11]16.2
Wattenberg, Adams Co., 31-3s-65w	150.0	90.4	7						150.8		
Berthoud Gas Co.—Berthoud, Larimer Co., sw 16-4n-69w	2.5	0.8	3						2.0		
Brighton Gas Processors—Brighton, Weld Co., se4 se4 28-1n-67w	2.5	1.3	4						6.0		
Cabin Creek Gas—Cabin Creek, Adams Co., sw4 nw4 31-3s-59w	1.5	0.2	3						1.8		
Cerrito Land Co.—Piceance Creek, Rio Blanco Co., 15-25-96w (25 miles se of Rangely)	40.0	15.0	2		6.0				6.0		
Chevron USA Inc.—Rangely Hagood, Rio Blanco Co., 23-2n-102w	10.0	5.7	3						18.4		
Colorado Gathering & Processing Corp.—Pleasant Valley, Weld Co., nw¼ se½ 28-6n-65w	9.5	8.5	3&6						30.0		
Coors Energy Co.—Wattenberg, Weld Co., 25-1n-68w	8.0	3.9	3						4.0		
Damson Gas Processing Corp.—Roggen, Weld Co., se¼ sw¼ 24-2n-63w	23.0	14.3	7		30.4				26.5		
Roggen South, Weld Co., sw¼ sw¼ 29-1n-63w	5.0	2.0	3						6.0		
Vallery, Morgan Co., 15-3n-59w	1.5	0.8	3						2.5		
Ecological Engineering Systems Inc.—Holster, Adams Co., ne sw 21-25-66w	1.0	0.5	3						1.9		
Lanson Farms, Weld Co., nw4-ne4 35-2n-68w	1.5	0.4	3						2.2		
Excelsior Oil Corp.—Yenter, Logan Co., nw¼ 2-8n-54w	8.0	5.0	2		11.8				. . . .	†10.5	
Gasco Inc.—Collbran, Mesa Co., 35-9s-95w	5.0	3.4	3						0.7		
DeBeque, Garfield Co., 6-8s-97w	15.0	9.2	3						0.6		
Piceance, Rio Blanco Co., 22-1n-97w	15.0	13.0	3						1.2		
South Canyon, Garfield Co., 3-8s-104w	15.0	9.2	3						2.0		
Gulf Energy Processing Corp.—Arroyo, Adams Co., 8-3s-58w	0.7	0.5	3					2.6			
Chalice, Arapahoe Co., 10-4s-64w	3.0	1.5	3					3.9			
Papoose Canyon, Dolores Co., 5-40n-18w	5.0	2.1	3					4.1			
Running Creek, Elbert Co., 21-6s-64w	3.5	1.1	3					2.0			
Koch Hydrocarbon Co.— Third Creek, Adams Co., 18-2s-65w	25.0	13.6	2						75.1		
Loveland Gas Processing CL—*Loveland, Larimer Co., 30-5n-68w	6.0	2.2	3		3.8				. . . .	†4.2	
Natural Gas Associates—Eaton, Weld Co., se 34-7n-66w	15.0	13.0	3						44.5		
Kersey, Weld Co., se 35-4n-66w	18.0	18.0	3						43.2		
NGL Production Co.—Foundation Creek, Rio Blanco Co., 26-45n-102w	20.0	11.0	3						8.0		
North Douglas Creek, Rio Blanco Co., 19-1s-101w	20.0	18.0	3						16.0		
Northwest Pipeline Corp.—Ignacio, La Plata Co., sw¼ 36-34n-9w	300.0	185.0	1		40.7		52.8		181.5	34.2	
Peoples Natural Gas Co.—Clyde, Prowers Co., 19-23s-45w	5.0	2.5	3					2.0			
Planet Engineers Inc.—McClave, Kiowa Co., sw½ 32-20s-48w	7.5	2.6	2		3.3				. . . .	†2.0	
Sun Exploration & Production Co.—Denver Central, Arapahoe Co., 5-5s-62w	12.0	4.1	2		13.0				10.3		
Dragon Trail, Rio Blanco Co., 35-2s-102w	18.0	8.4	2		7.0				6.9		
Texaco Inc.—Wilson Creek, Rio Blanco Co., 27-3n-94w	4.5	2.0	3		1.4				5.3		
Texas Oil & Gas Corp.—Baca County, 33-42-11 Grid 9	5.0	1.0	3						1.6		
Trend Exploration Ltd.—Buck Peak, Moffat Co., se4-sw4 9-6n-90w	3.0	0.5	2		0.3	0.8					
Union Oil Co. of California—Adena, Morgan Co., 12-1n-58w	4.0	1.0	3						5.2		
Vessels Gas Processing Co.—Irondale, Adams Co. se¼ 24-25-61w	8.0	2.5	3						10.3		
Vessels Gas Processing Ltd.—Ft. Lupton, Weld Co., se¼ 26-1n-67w	20.0	3.0	3						11.9		
Vessels Oil & Gas Co.—Oily Gas Fractionator, Weld Co., se¼ 26-1n-67w			§	(11.6)	(31.3)		(27.0)			(30.7)	
Wexpro Co.—Dove Creek, Dolores Co., 5-40n-18w	10.0	3.8	3						7.9		
Total	**876.2**	**507.3**			**129.8**	**0.8**	**52.8**	**14.6**	**819.5**	**50.9**	**16.8**

†Butane-gasoline mix. §Fractionation. (Figures in parenthesis do not represent primary production, and are not added in state totals)

	MMcfd			Production—1,000 gal day (Average based on the past 12 months)							
Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other

FLORIDA

Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Exxon Co. USA—Blackjack Creek, Santa Rosa, 23-4n-29w	9.0	5.0	6	7.4	8.4		6.3			3.0	
Jay, Santa Rosa Co., 9 n43-5n-29w	90.0	47.0	7	59.1	45.4		26.9			15.1	
Florida Hydrocarbons Co.—Brooker, Bradford Co.	NR	668.0	2		70.3	27.2	22.6			62.2	
Total	**934.0**	**720.0**		**66.5**	**124.1**	**27.2**	**55.8**	....	....	**80.3**	....

ILLINOIS

Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Damson Gas Processing Corp.—Keenville, Wayne Co., se¼ 27-1s-5e	1.5	0.6	3						2.9		
U.S. Industrial Chemicals Co., Division of National Distillers & Chemicals Corp.—Tuscola, Douglas Co., Ficklyn Township	550.0	456.0	2	497.6	352.8	46.9	79.0			6.0	
Total	**551.5**	**456.6**		**497.6**	**352.8**	**46.9**	**79.0**	....	**2.9**	**6.0**	....

KANSAS

Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Amoco Production Co.—Ulysses, Grant Co., 5-29s-38w	420.0	165.9	1		48.7		74.3		43.8		
Anadarko Production Co.—Cimarron, Seward Co., 23-33s-32w	20.0	5.3	2					2.8	2.8		
Interstate, Morton Co., 29-34s-43w	16.0	5.0	2					2.8	3.5		
Lone Star, Seward Co., se 18-33s-35w	4.0	2.9	3						2.3		
Woods, Seward, 22-33s-34w	11.0	6.5	2					3.7	7.0		
Cities Service Oil and Gas Corp.—Cheney, Kingman Co., nw4 22-28s-5w	100.0	53.0	7						97.0		
Hutchinson, Reno Co., sw4 22-23s-6w	...		†	(198.0)	(544.0)	(81.0)	(189.0)			(184.0)	
Jayhawk, Grant Co., 2-29s-35w	550.0	304.0	2&6						312.0		
Midway, Kingman Co., 33-27s-5w	30.0	24.0	2						33.0		
Spivey, Harper Co., 5-31s-8w	65.0	30.0	1		22.0		7.0			18.0	
Sunflower, Scott Co., 17-18s-33w	168.0	100.0	3&6						132.0		
Wichita, Sedgwick Co., 17-28s-1e	89.0	80.0	7						119.0		
Wilburton, Morton Co., 33-34s-41w	5.0	3.0	3						7.0		
Colorado Interstate Gas Co.—Lakin, Kearney Co., n2 of ne4 29-24s-36w	215.0	50.0	1						7.7		
Gulf Energy Processing Corp.—Cedar Vale, Cowley Co., 32-33s-8e	1.5	0.3	3					0.3			
Kansas Refined Helium Co.—*Otis, Rush Co., s½ 26-17s-16w 29.6 ac	23.0	14.0	3		0.2	0.4	0.9			1.8	
KN Energy Inc.—Scott City Helium, Scott Co., 17-18s-33w	75.0	62.0	3	2.2	33.8		18.5			4.3	
Scott City NGL, Scott Co., 17-18s-33w	150.0	99.8	1				2.0			12.8	
Mesa Petroleum Co.—*Ulysses, Grant Co., 10-30s-37w	242.0	51.8	2						61.1		
Mobil Oil Corp.—Hickok, Grant Co., 31-28s-35w	210.0	79.8	1		3.4				33.0	7.6	
National Helium Corp.—Seward Co., 23-33s-32w	1,000.0	501.0	3		9.6		25.1		76.1		
Northern Gas Products—Bushton, Ellsworth Co., 31-17s-9w	950.0	844.6	2&7	245.6	575.0	70.7	156.1			123.2	
Northern Helex Co.—Northern Helex, Ellsworth Co., 31-17s-9w	520.0	416.2	3								‡1.1
Northern Natural Gas Co.—Holcomb, Finney Co., 3-24s-34w	200.0	178.0	3						28.7		
Peoples Natural Gas Co.—Burrton, Harvey Co., 21-23s-3w	4.5	3.0	3					2.2			
Texaco Inc.—Medicine Lodge, Barber Co. 13-32s-12w	30.0	10.1	2		6.8				6.9		
Minneola, Ford Co., 13-29s-25w	25.0	8.8	2		12.1				12.3		
Total	**5,124.0**	**3,099.0**		**247.8**	**711.6**	**71.1**	**283.9**	**11.8**	**985.2**	**167.7**	**1.1**

---

†Fractionation. (Figures in parenthesis do not represent primary production, and are not added in state totals). ‡Helium—MMcfd.

KENTUCKY

Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Kentucky Hydrocarbon—Dwale Cryogenic, Floyd Co.	20.0	17.5	3&7								†41.6
Maytown, Floyd Co.	51.0	51.3	3-6-7								†191.3
Tennessee Gas Pipeline Co.—Gabe, Green Co.	845.0	603.0	3								‡208.0
Total	**916.0**	**671.8**		....	....	....	....	....	....	....	**440.9**

---

†Ethane and heavier hydrocarbons in one stream. ‡Mixed stream, hydrocarbon liquids.

LOUISIANA

Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Amoco Production Co.—TSMA, Vermilion Par., 11-14s-1e	298.0	140.6	2						144.4		
Anchor Gasoline Corp.—Krotz Springs, Pointe Coupee Par., 40&41 6s-7e	50.0	NR	1					9.7		2.8	
ANR Production Co.—Pelican, St. Mary Par., 51&52 115s-11e	250.0	213.0	7						190.9		
Arco Oil & Gas Co.—*Bayou Sale, St. Mary Par., 17-ILS-9e	97.0	40.6	2		9.1		5.7			7.2	
Arkla Inc.—Bistineau, Webster Par., se-36-17n-10w se 31-17w-9w	60.0	25.6	1					5.0		5.4	††0.9
Gayles, Caddo Par., 30-16n-12w	20.0	2.7	5							0.6	
Sligo, Bossier Par., se 9-18s-21w	11.0	3.6	5							1.0	
Cal Gas Corp.—Beacon, Webster Par.,											

Company, plant, location	MMcfd Gas capacity	Gas through-put	Process method	Production—1,000 gal/day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
26-21n-9w	50.0	21.7	2	....	8.5	3.9	3.9	....	....	10.1	[11]1.3
Beacon Fractionation, Webster Par., 26-21n-9w	....	....	†	....	(36.5)	(26.2)	(32.6)	....	....	(47.0)	....
Celeron Oil & Gas Co.—Aymond, St. Mary Par., 13-14s-9e	40.0	25.0	7	....	....	....	....	....	35.0	....	....
Gibson, Terrebonne Par., 77-16s-15e	90.0	75.0	7	....	....	....	....	....	85.0	....	....
Plaquemine, Iberville Par., 46-10s-12e	225.0	136.0	7	....	40.8	19.0	17.7	....	....	41.0	[5]140.0
St. Landry, Evangeline Par., 35-2s-2e	60.0	58.0	2	....	23.0	....	16.5	....	....	13.0	....
Chenier Oil CI—Chenier I, Vermilion Par., 23-12s-1e	21.0	13.6	4	....	....	....	....	....	41.5	....	....
Chevron USA Inc.—Sabine Pass, Cameron Par., 7-15s-15w	195.0	52.6	2	....	....	....	....	....	36.7	....	....
Cities Service Co.—Crowley, Acadia Par., 41&44 9s-1w-1e	45.0	17.0	7	....	....	....	....	....	14.0	....	....
Lake Charles, Calcasieu Par., 19-10s-9w	....	....	†	(402.0)	(301.0)	(138.0)	(124.0)	....	....	(195.0)	....
*Panther Creek, Claiborne Par., 30-22n-4w	11.0	8.0	7	....	....	....	....	....	12.0	....	....
Saint Amelia, St. James Par., 12-12s-16e	38.0	9.0	2	....	....	....	....	....	1.0	....	....
Claiborne Gasoline Co.—Claiborne Par., 20-21n-4w	NR	33.6	2	....	27.0	12.7	16.3	....	....	....	[2]88.4 [3]31.8 [4]0.8 [10]36.8
Conoco Inc.—Acadia Par., 31-9s-1w	45.0	35.0	7	22.8	12.1	....	8.0	....	....	....	[3]3.8 [6]15.7 [9]0.5
Gillis, Calcasieu Par., se¼ sw¼ 14-9s-8w	180.0	170.0	7	119.2	61.2	....	37.9	....	....	24.9	....
Grand Chenier, Cameron Par., 2-39-40 15s-6w	950.0	450.0	2&7	....	....	....	....	....	361.8	....	....
Damson Gas Processing Corp.—Kings Bayou, Cameron Par., ne¼ 34-14s-7w	13.3	8.0	2	....	....	....	....	....	10.4	....	....
Exxon Co.—Bluewater, Acadia Par., 34-10s-1w	950.0	652.0	7	....	....	....	....	....	595.3	....	[11]0.2
Garden City, St. Mary's Par., 45-46-15s-10e	900.0	100.0	2	....	....	....	....	....	146.0	....	[11]0.7
Grand Isle, Jefferson Par., 32-21s-25e	110.0	70.0	7	....	....	....	....	....	123.6	....	[11]0.9
Thibodaux, Lafourche Par., 35-36-15s-16e	45.0	7.7	2	....	5.0	1.8	1.4	....	....	3.0	[11]1.2
Gulf Energy Processing Corp.—Lake LaRose, St. Martin Par., 29-9s-8e	16.0	7.4	7	....	....	....	....	6.7	....	....	....
Hunt Energy Corp.—Kinder, Allen Par., 23-5s-5w	25.0	2.2	2	....	2.9	....	1.9	....	....	1.8	....
J-O'B Operating Co.—South Keatchie, DeSoto Par., 25-14n-16w	10.0	3.0	2	....	....	....	....	2.2	....	....	[11]5.1
Kerr-McGee Corp.—Bayou Crook Chene, St. Martinville Par., 34-10s-9e	12.5	NR	2	....	....	....	....	....	13.2	....	....
Dubach-Calhoun complex, Lincoln Par., 27-20n-3w 21-18n-1	175.0	NR	2	39.2	11.4	15.2	....	....	....	0.7	[2]76.3 [4]1.7 [7]7.4 [12]14.2
Louisiana Land & Exploration Co.—Pointe au Chien, Terrebonne Par., 18-19s-20e	125.0	80.0	7	....	....	....	....	....	80.0	....	....
Marathon Oil Co.—Burns Point, St. Mary Par., 10-17s-9e	200.0	94.9	7	....	....	....	....	....	78.0	....	....
Cotton Valley, Webster Par., 26-21n-10w	65.0	30.8	7	41.0	18.5	....	14.0	....	....	12.3	[11]16.9
Mitchell Energy & Development Corp.—Jackson Par	5.0	2.4	3	....	....	....	....	....	2.7	....	....
Mobil Oil Exploration & Producing Southeast Inc.—Cameron Par., 23-15s-13w	310.0	196.0	7	....	....	....	....	....	41.7	....	[5]73.2
Cow Island, Vermilion Par., 29-13s-2e	950.0	321.0	2	....	....	....	....	....	245.0	....	....
Dulac, Terrebonne Par., 2&68 10s-17e	50.0	26.0	7	....	....	....	....	....	45.0	....	....
Grand Chenier, Cameron Par., 45&42-15s-6w	125.0	27.0	7	....	....	....	....	....	23.6	....	....
Iowa, Jefferson Davis Par., 18-9s-6w	500.0	354.0	7	....	....	....	....	....	176.2	....	....
Kaplan, Vermilion Par., 24-12s-2e	20.0	11.0	7	9.0	....	....	....	....	20.6	....	....
Lowry, Cameron Par., 16-12s-4w	300.0	214.3	7	157.6	64.7	21.8	14.9	....	....	37.4	....
Riverside fractionation, Ascension Par., 8-10s-2e 46-9s-2e	....	....	†	....	(178.1)	(54.9)	(47.7)	....	....	(95.0)	([5]191.8)
Sea Robin 2, Vermilion Par., 21-13s-14e	150.0	99.0	7	....	....	....	....	....	113.6	....	....
South Timbalier, LaFourche Par., 28-20s-22e	125.0	104.0	7	....	....	....	....	....	70.1	....	....
Phillips Petroleum Co.—No. Erath and Grosse Isle, Vermilion Par., sw4 se4 41-13s-4e	45.0	NR	2	....	....	....	....	....	....	....	....
Rollover, Jefferson Davis Par., nw4 22-11s-3w	190.0	NR	2	....	....	....	....	....	....	....	....
Placid Oil Co.—Black Lake, Natchitoches Par., 14-11n-6w	217.5	202.0	2	....	....	....	....	....	230.8	....	[11]43.2
Patterson II, St. Mary Par., 48-15s-11e	600.0	63.7	7	....	....	....	....	....	100.8	....	....
Resources Extraction & Processing Co.—Bayou Vista 1, St. Mary Par., 11-155-11e	200.0	200.0	7	64.2	24.3	7.6	7.3	....	....	16.0	....
Shell Western E&P Inc.—Barracuda, Cameron Par., 15s-13w	100.0	107.8	7	....	....	....	....	....	122.7	....	....
Black Bayou, Cameron Par., 17-12s-12w	18.0	7.7	2	....	....	....	....	....	2.2	....	....
Calumet, St. Mary Par., 11, 12, 51, 52,-15s-11-3	1,200.0	683.2	2	....	....	....	....	....	375.3	....	[11]14.2
Crawfish, St. Charles Par., 36-13s-8e	120.0	47.0	7	....	....	....	....	....	52.5	....	....
Norco fractionator, St. Charles Par., 6-12s-8e	....	....	†	(583.7)	(327.4)	(96.5)	(112.0)	....	....	(201.9)	....
North Terrebonne, Terrebonne Par., 19,20, 29,33-17s-15e	1,250.0	871.9	2	....	....	....	....	....	687.9	....	[11]9.6
Stingray, Cameron Par., 33&34-15s-13w	225.0	235.0	2	....	....	....	....	....	109.0	....	[11]0.2
Tebone fractionator, Ascension Par., 45&46-9s-2e	....	....	†	(247.8)	(195.4)	(60.3)	(56.5)	....	....	(127.4)	....
Timbalier Bay, Terrebonne Par., nw4 of 32-16 sw 4 of 33-19s-19e	100.0	31.4	7	....	....	....	....	....	49.5	....	....
Toca, St. Bernard Par., 54-14s-14e	830.0	520.1	2&7	....	....	....	....	....	656.2	....	[11]3.8

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Production—1,000 gal day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
*Weeks Island, Iberia Par., 37-14s-6e	130.0	25.9	2		2.8				6.7		
Yscloskey, St. Bernard Par., 39-13s-15e	1,850.0	1,335.5	2						864.8		
Sid Richardson Carbon & Gasoline Co.—Hico-Knowles, Lincoln Par., 9 acres sw¼ of se¼ 10 & nw¼ of ne¼ 15-20n-3w	15.0	2.0	7						3.0		[11]0.1
Southern Natural Gas Co.—*Bear Creek, Bienville Par., 13-6w-16n	900.0	380.0	1						40.4		
Sun Exploration & Production Co.—Delhi, Richland Par., 15-17n-9e	22.0	19.2	6	5.0	7.7	2.2	3.0			20.1	
*Fordoche, Pointe Coupee Par., 41-6s-8e	50.0	35.4	2						35.0		
*Gillis-English Bayou, Calcasieu Par., 26-8s-5w	20.0	17.9	2						29.2		
Maurice, Lafayette Par., 31-10s-4e	32.0	10.2	2						9.5		
South Sarepta, Bossier Par., 21-22n-11w	25.0	9.4	2		3.1		3.9			4.1	
Taylor Energy Co.—*Chalkley, Cameron Par., 27-12s-12w	25.0	2.5	1						2.1		
Tenneco Oil Co.—*Stephens, Claiborne Par., 6&7-13s-12e	35.0	19.8	2		2.9		2.6			4.4	
Texaco Inc.—Alligator Bayou, St. Martin Par. sw14 34-10s-9e	30.0	14.0	7						27.0		
Floodway, St. Mary Par., 16-16s-12e	700.0	320.0	7						335.9		
Fordoche, Pointe Coupee Par., 28-6s-8e	45.0	2.0	2		1.6		1.0			1.0	
Henry, Vermilion Par., 21-13s-4e	1,200.0	619.0	2	183.5	116.6	35.9			124.1		
Hollywood, Terrebonne Par., 10-17s-17e	200.0	30.0	2						36.6		
Paradis, St. Charles Par., 39-14s-20e	1,200.0	352.0	2&7		96.3	31.1	40.0			67.2	
Sea Robin, Vermilion Par., 21-13s-4e	900.0	527.0	7	259.9	164.2	47.7	59.0			122.7	
Venice, Plaquemines Par., 25&26 21s-30e	65.0	30.0	2						22.8		
Texas Gas Exploration Corp.—Eunice, Acadia Par., sw¼ of nw¼-12-7s-2w	1,350.0	1,024.0	2&7	242.6	230.6	78.3	65.5			142.4	
Lake Enfermer, 9-20s-23e	40.0	26.0	7						34.6		
Ruston, Lincoln Par., ne4 of nw4 12-19n-4w	30.0	19.0	3						10.0		
Tipperary Corp.—Perry Point, Vermilion Par., 41-10-2e	15.0	8.0	7						10.0		
White Castle, Iberville Par., 15-10s-13e	7.5	2.0	7						7.5		
Union Oil Co. of California—Houma, Terrebonne Par., 26-17s-17e	80.0	7.0	2						9.5		
Union Texas Petroleum—Cox Bay, Plaquemine Par.	8.0	11.0	2		2.0	0.7	0.8			2.3	
Pointe-ala-Hache, Plaquemine Par.	24.0	0.8	2		1.2	0.5	0.4			1.4	
Rayne, Acadia Par., 86-8s-2e			†	(73.6)	(31.7)	(11.3)	(9.4)			(23.3)	
Sligo, Bossier Par., 29-18n-11w	76.0	23.0	2		8.9	2.3	2.7			7.4	
*Toca, St. Bernard Par., 56-14s-14e	160.0	94.0	2		27.4	8.1	9.2			17.4	
Warren Petroleum Co.—Johnsons Bayou, Cameron Par., 32&33-15s-12w	NR	8.6	7						5.5		
Krotz Springs, St. Landry Par., 22-6s-7e	NR	13.5	2		23.3		29.6		43.0		
Mermentau, Acadia Par., n½-n½ 70-10s-2w	NR	22.0	1						29.0		
Vermilion Par., s2 sw4 nw4 28-13s-2e	NR	47.0	7						57.5		
Venice, Plaquemines Par., 25-21s-30e	NR	464.0	2		99.8	41.5	41.4		199.4	60.3	
Total	**22,983.5**	**12,810.8**		**1,144.0**	**1,096.9**	**330.3**	**404.6**	**23.6**	**7,037.3**	**627.9**	**588.9**

†Fractionation. (Figures in parenthesis do not represent primary production, and are not added in state totals).

MICHIGAN

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Amoco Production Co.—Kalkaska Co., 31-27n-7w	180.0	122.9	7		63.2				110.7		[11]35.7
ANR—*Loreed, Osceola Co., 30-18n-10w	32.0	31.0	4						11.0		
Lakeville Gas Associates.—Leonard, Oakland Co., Addison e¼-15-5n-11e	20.0	4.5	3						8.0		
Marathon Oil Co.—Scipio, Hillside Co., 2-5s-3w	38.0	10.0	2		24.7					20.6	
Michigan Consolidated Gas Co.—Romeo, Macomb Co., 14-4n-12e	15.0	13.3	3						8.9		
Mobil Oil Corp.—Aurelius, Ingham Co., 36-2n-2w	23.0	9.3	2		11.4				12.8		[9]1.9
Shell Western E&P Inc.—Kalkaska Co., 32-27n-7w	350.0	203.0	2&7						750.0		
Sun Exploration & Production Co.—*Columbus III, Saint Clair Co., 3-5n-15e	7.4	6.2	3						5.0		
Norwich, Missaukee Co.	10.0	4.9	6						31.1		
Total	**675.4**	**405.1**		....	**99.3**	....	....	....	**937.5**	**20.6**	**37.6**

MISSISSIPPI

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Damson Gas Processing Corp.—Waveland, Hancock Co., 10-8s-51w	96.0	25.3	7						12.0		
Koch Hydrocarbon Co.—Harmony, Clarke Co., 26-2n-14e	30.0	4.5	3		5.6		4.9			6.4	
Shell Western E&P Inc.—Goodwater, Clarke Co., 5-10n-8w	15.0	5.5	3		2.3		3.1			2.5	
Tallahala Creek, Smith Co., 5-1n-9e	4.0	4.0	3						3.5		
Thomasville, Rankin Co., 27-4n-3e	100.0	80.0									
Southern Natural Gas Co.—*Muldon, Monroe Co., 27-15s-6e	750.0	368.0	5						14.8		
Total	**995.0**	**487.3**		....	**7.9**	....	**8.0**	....	**30.3**	**8.9**	....

MONTANA

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
ANR Production Co.—Stateline, Richland Co. 12-13 22n-59e	12.0	3.0	3		6.6	6.1					
Big Horn Fractionation Co.—Baker, Fallon Co., sw4 sw4 6-7n-60e	2.5	2.0	3		7.7	2.1		5.5	2.2	1.5	
Flying J Inc.—Westco Refining, Glacier Co., 22-33n-5w	30.0	18.9	2		9.0		6.4		7.1		

Company, plant, location	MMcfd			Production—1,000 gal/day (Average based on the past 12 months)							
	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
MGPC—Fairview, Richland Co., 24-25n-58e	6.0	3.9	3		8.4			7.9			
Shell Western E&P Inc.—Cabin Creek, Fallon Co., 18-10n-58e	1.9	1.9	3						7.0		
Little Beaver, Fallon Co., 17-4n-62e	0.4	0.4	3						1.4		
South Pine, Wibaux Co., 10-11n-57e	1.2	1.2	4						5.4		
True Oil Co.—Bob Rhodes, Richland Co., ne 4-25n-58e	4.0	1.0	3		2.3				8.1		
Utex Oil Co.—Stateline, Richland Co., nw¼ sw¼ 8-23n-59e	12.0	3.0	3		8.9				8.0	....	[11]1.5
Total	**70.0**	**35.3**		....	**42.9**	**8.2**	**6.4**	**13.4**	**39.2**	**1.5**	**1.5**

NEBRASKA

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Cities Service Co.—Kimball, Kimball Co., 10-12n-55w	1.5	1.0	3						5.0		
Marathon Oil Co.—*West Sidney, Cheyenne Co., 4-12n-50w	12.0	2.1	2		2.8		2.1			1.7	
Total	**13.5**	**3.1**		....	**2.8**	....	**2.1**	....	**5.0**	**1.7**	....

NEW MEXICO

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Adobe Oil & Gas Corp.—Antelope Ridge, Lea Co., 15-23s-34e	30.0	11.0	7						24.0		
Amoco Production Co.—*Empire Abo, Eddy Co., 3-18s-27e	42.0	40.8	7	84.5	49.8		23.6			23.5	
Cabot Corp.—Hobbs, Lea Co., 28-18s-36e	61.0	22.3	7						43.1		
Cities Service Co.—Abo, Eddy Co., 35-17s-27e	4.0	4.0	7						8.0		
Bluitt, Roosevelt Co., 15-8s-36e	25.0	25.0	2						99.0		
Burton Flats, Eddy Co., 14-20s-28e NMPM	8.0	3.0	7						11.0		
Conoco Inc.—Maljamar, Lea Co., sw se 21-17s-32e	50.0	36.7	7						135.3		
El Paso Natural Gas Co.—Blanco, San Juan Co., n2-n2 14-29n-11w	558.0	379.6	1						311.3		
Chaco, San Juan Co., sw4 16-26n-12w	594.0	409.8	2						605.0		
Jal No. 3, Lea Co., nw4-sw4 33-24s-37e	225.0	95.9	2						121.2		
Jal No. 4A, Lea Co., se4-se4 31-23s-37e and s2-sw4 32-23s-37e	185.0	97.2	1						68.2		
Jal No. 4B, Lea Co., se4-se4 31-23s-37e and s2-sw4 32-23s-37e			†		(52.7)		(64.7)			(72.0)	
San Juan Co., 1-29n-15w	71.0	44.8	1		8.4		11.8			13.3	
Wingate, McKinley Co., 16&17-15n-17w			†		(366.9)	(101.6)	(189.9)			(260.9)	
Gas Co. of New Mexico, Division of New Mexico Public Service Co.—Avalon, Eddy Co., 9-21s-27e	30.0	14.6	2						13.0		
Marathon Oil Co.—Indian Basin, Eddy Co., 23-21s-23e	210.0	109.9	7						184.5		[11]14.2
Mesa Petroleum Co.—South Blanco Creek, 6-7w-23n	6.0	2.6	3						13.5		
Minerals Inc.—Hobbs, Lea Co., sw¼-sw¼-ne¼ 36-18s-36e	45.0	40.8	7					55.6			
Kermac, Eddy Co., 12 4-21s-31e	6.0	3.6	6					1.9			
Mitchell Energy & Development Corp.											
Pecos Diamond No. 1, Eddy Co.	20.0	5.1	7						7.7		
Pecos Diamond No. 2, Eddy Co.	20.0	5.1	7						7.7		
White Ranch, Chaves Co.	7.5	1.5	7						6.9		[11]0.2
Northern Natural Gas Co.—Hobbs, Lea Co., 6-19s-37e	220.0	114.0	2						137.0		
Phillips Petroleum Co.—Artesia, Eddy Co., s2 se4 7-18s-28e	43.0	NR	7								
Eunice, Lea Co., ne4 3-22s-37e	80.0	NR	7								
Lee, Lea Co., sw4 se4 30 nw4-ne4-31-17s-35e	35.0	NR	7								
Lusk, Lea Co., nw4 ne4 19-19s-32e	60.0	NR	2								
Southern Union Refining Co.—Kutz No. 1, San Juan Co., nw4 13-28n-11w	100.0	67.4	2						175.6		
Kutz No. 2, San Juan Co., nw4 13-28n-11w	85.0	74.3	7						230.3		
Lybrook, Rio Arriba Co., nw¼ 14-23n-7w	85.0	51.5	7						177.1		
Tenneco Oil Co.—Gallegos Canyon, San Juan Co., se¼-sw¼-13-25n-10w NMPM	19.4	5.4	7						22.1		
Texaco—Buckeye, Lea Co., se¼ of se¼ 36-17s&18s-34e, 1 mi se of Buckeye	25.0	7.7	6						83.1		
Eunice No. 1, Lea Co., 27-22s-37e	105.0	78.4	7		73.1	11.8	38.0		0.6	57.2	[5]206.5 [11]3.3
Tipperary Corp.—Denton, Lea Co., 2-7-155-37e	15.0	4.0	7						35.0		
Warren Petroleum Co.—Eunice, Lea Co., ne4 3-22s-37e	NR	50.3	7						249.6		
Monument, Lea Co., sw4 36-19s-36e	NR	48.7	7						212.4		
Saunders, Lea Co., 34-14s-33e	NR	28.5	6						220.2		
Snyder Ranch, Eddy Co., sw4-sw4 15-19s-31e	NR	12.0	7						19.8		
Vada, Lea Co., sw2-sw4-nw4 23-10s-33e	NR	8.9	6						55.8		
Total	**3,255.2**	**2,078.4**		**84.5**	**131.3**	**11.8**	**73.4**	**57.5**	**3,278.0**	**94.0**	**224.2**

†Fractionation. (Figures in parenthesis do not represent primary production, and are not added in state totals.)

NORTH DAKOTA

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Amoco Production Co.—Killdeer, Dunn Co., 6-145n-94w	2.5	1.4	2						3.8		[11]0.4
Cities Service Co.—Lignite, Burke Co., nw4 7-162n-91w	11.0	8.0	2		14.0			17.0			

Company, plant, location	MMcfd			Production—1,000 gal day (Average based on the past 12 months)							
	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Ecological Engineering Systems Inc—Alexander, McKenzie, e½ sw¼ sw¼ 18-152n-101w	6.0	3.0	3								1.9
Temple, Williams Co., Lot 4, 159n-95w	4.0	1.0	3						3.2		0.3
Kerr-McGee Corp—Boxcar Butte, McKenzie Co., 51-148n-102w	6.0	NR	3		5.5		3.4			2.1	
Koch Hydrocarbon Co—Grasslands, McKenzie Co., 36-148n-105w	60.0	41.8	7		56.8		45.4			38.5	
Phillips Petroleum Co—Tioga, Williams Co. 26-157n-95w	105.0	66.0	2		76.1		49.3			31.9	
Williston, Williams Co., sw4 26-154n-101w	30.0	NR	7								
True Oil Co—Red Wing Creek, McKenzie Co. ne 27-148n-101w	10.0	2.5	2		5.3			12.2			
Warren Petroleum Co—Little Knife, Dunn Co. 16-141n-98w	NR	31.8	7	56.0					57.3		
Western Gas Processors Ltd—Teddy Roosevelt, Billings Co., nw4-ne4 16-142n-99w	40.0	21.0	7	77.3	33.1		30.7			26.7	14.8
Total	**314.2**	**205.3**		**133.3**	**190.8**	....	**128.8**	**29.2**	**64.3**	**99.2**	**17.4**
OKLAHOMA											
American Quasar Petroleum Co—East Knox, Grady Co., 25-4n-6w	2.0	0.3	3						0.7		
Amoco Production Co—Elmwood, Beaver Co. 24-2n-24ecm	80.0	18.9	2						38.3		
Hitchcock-Okeene, Blaine Co., 13-17n-11w	55.0	42.5	7						80.3		0.1
Mooreland, Woodward Co., 30-23n-18w	150.0	72.8	7						160.6		5.5
*North Okarche, Kingfisher Co., 8-15n-17w	25.0	6.2	4							0.6	
Anadarko Production Co—Beaver Co. se 25-6n-21ecm	10.0	4.6	7						7.2		
North Richland Center, Texas Co., 33-6n-12ecm	25.0	10.3	2					13.3	10.6		
ANR Production Co—Custer Co., ne4 5-13n-17w	160.0	109.0	7						121.2		
Arco Oil & Gas Co—Covington, Garfield Co. w2-sw4 19-22n-3w	15.0	14.4	7	11.5	15.2	2.2	6.3			7.6	0.4
Drumright, Creek Co., nw4 sw4 28-18n-7e	15.0	6.8	1		14.7	2.5	7.8			12.6	0.7
Mannford, Creek Co., w ne 30-18n-9e	10.0	2.6	3	0.9	1.4	0.4	1.2			1.8	
Northwest Stillwater, Noble Co., n2 nw-ne ne 25-20n-1e	3.0	1.4	7	0.6	1.3	0.3	0.8			1.2	
Seminole Co., sw4-ne4 10-8n-6e	20.0	9.7	1		20.7	2.4	8.2			11.7	1.7
Southeast Flynn, Garfield Co., se-se 8-20n-5w	12.0	4.9	3	3.3	4.0	0.7	2.0			2.6	
Arkla Inc—Elk City, Beckham Co. 2-10n-21w	10.0	0.5	5							0.1	
Cabot Corp—Beaver Co., 25-5n-23ecm	20.0	10.1	7						28.6		
Champlin Petroleum Co—Enid, Garfield Co. 34-23n-6w	36.0	25.0	2						92.9		
West Edmond, Logan Co., 21-4n-15w	22.0	17.5	6						69.5		
Cities Service Co—Ambrose, Kay Co., sw4 9-27n-1w	290.0	193.0	2		76.0	16.0	34.0			33.0	22.0
Garrett, Kay Co., ne4-ne4 34-27n-1e	3.0	3.0	4						8.0		
Murdock, Texas Co., 32-5n-16ecm	40.0	10.0	7						29.0		
Rodman, Garfield Co., 27-20n-8w	90.0	41.0	7						149.0		
CNG Producing Co—Southwest Davis, 14-15-1e	1.0	0.9	2						4.2		
Colorado Interstate Gas Co—Keyes, Cimarron, e2 of se4 17-5n-7e	50.0	16.0	3						3.1		
Conoco Inc—Cashion, Kingfisher Co., ne ne 9-15n-5w	30.0	29.7	7						108.5		
Clinton, Custer Co., sw 26-12n-16w	75.0	57.8	7						170.4		
Hennessey, Kingfisher Co., nw nw 36-19n-7w	31.6	30.0	7						132.3		
Mustang, Grady Co., 30-10n-5w	30.0	13.0	7						3.0		
Damson Gas Processing Corp—Hooker, Texas Co., 8-4n-17e	70.0	30.0	7						90.0		
Deisenroth Gas Products Inc—Okemah, Okfuskee Co., 23-11n-93	1.0	0.5	1					2.3			
Diamond Shamrock Corp—Roger Mills, 5-15n-21w	50.0	12.0	7						36.0		
El Paso Natural Gas Co—Beaver Co., se4-ne4 18-3n-26e	40.0	21.5	3						19.0		
Enserch Exploration Inc—Katie, Garvin Co., 36-2n-2w	20.0	4.9	1						8.2		
Wallville, Garvin Co., 27-4n-3w	8.0	6.0	2						9.1		
Excelsior Oil Corp—Tyrone, Texas Co., sw¼ 19-6n-19 ecm	36.0	25.9	7						62.9		
Exxon Co—Camargo, Dewey Co., 10-18n-19w	15.0	0.8	2							15.4	1.0
Dover-Hennessey, Kingfisher Co., 1-18n-7w	80.0	54.0	7						248.8		7.4
Farmland Industries Inc—Lamont, Grant Co., 19-26n-3w	30.0	21.0	2&7						73.5		
Gulf Energy Processing Corp—Antioch, Garvin Co., 17-3n-2w	10.0	3.0	3					10.5			
East Guthrie, Logan Co., 3-15n-1w	5.0	3.0	3					5.9			
Pauls Valley, Garvin Co., 12-3n-1w	0.7	0.4	3					1.3			
West Guthrie, Logan Co., 30-15n-2w	12.0	10.0	3					24.2			
Kerr-McGee Corp—Milfay, Creek Co., 21-15n-7e	12.0	NR	2		8.5		2.3		4.0		
Koch Hydrocarbon Co—Fitts, Pontotoc Co., 30-2n-7e	12.0	1.7	3		1.8					4.7	
Mapco Production Co—SW Davis, Murray Co., 11-1s-1e	2.0	1.0	3						5.0		
Mobil Oil Corp—Chitwood, Grady Co., 34-5n-6w	60.0	49.2	7						157.6		7.1

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Production—1,000 gal/day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
NE Trail, Dewey Co., 1-17n-18w	24.0	14.9	2		8.1				27.9		[9]2.2
Postle Hough, Texas Co., 13-5n-13ecm	18.5	2.7	2						16.3		[9]0.4
*Putnam-Oswego, Dewey Co., 35-16n-16w	50.0	43.0	7						59.1		[9]0.4
Seiling, Woodward Co., 32-20n-17w	20.0	3.3	3	(All products fractionated at NE Trail)							
Sholem Alechem, Stephens Co., 2-1s-4w	70.0	42.2	7		27.1		3.4		158.6	19.2	[9]1.5
West Putnam, Dewey Co., 9-17n-17w	11.0	1.4	3	(All products fractionated at NE Trail)							
Mustang Gas Products Co.—Calumet, Canadian Co., ne4 28-14n-9w	250.0	125.0	2		56.0	¶48.7					
Northern Natural Gas Co.—Cabot-Highland, Beaver Co., 18-4n-27e	50.0	7.7	5								[11]1.8
Oklahoma Gas Pipeline Co.—Tyrone, Texas Co., sw¼ 11-6n-18e	60.0	30.0	7	2.6	10.8	2.7	6.7			7.9	
Phillips Petroleum Co.—Aline, Alfalfa Co., 7-23n-11w	45.0	28.3	2		19.1				21.6		
Bradley, Garvin Co., ne4 nw4 18-4n-4w	140.0	NR	1								
Cimarron, Woodward Co., e2 ne4 27-20n-17w	56.0	NR	7								
Creek, Tulsa Co., s2 sw4 nw4 7-17n-13e	25.0	NR	7								
Fox, Carter, Co., 28-2s-3w	70.0	33.5	7	51.8	52.0	6.3	20.9			20.7	
Kingfisher Co., nw4 sw4 9-15n-5w	175.0	NR	7								
Lucien—1, Noble Co., 18-20n-2w	12.0	12.0	7						47.9		
Lucien—2, Noble Co., 18-20n-2w	10.0	7.7	3						18.5		
Norge, Grady Co., ne4 3-6n-8w	27.0	NR	3								
Okarche, Kingfisher Co., se4 ne4 31-15n-8w	150.0	NR	7								
Oklahoma Co., ne4 sw4 1-11n-3w	16.0	NR	1								
Osage Co., se4 32-26n-7e	15.0	NR	3								
Seiling, Dewey Co.	75.0	NR	7								
Sooner No. 1, Major Co., se4 se4 17-20n-9w	12.0	NR	3								
Pioneer Gas Products Co.—Binger, Caddo Co., 26-10n-11w	15.0	4.8	7					26.7			
Madill, Marshall Co., 32-7e-5s	27.0	18.0	2		23.5	2.1	7.5			8.0	
Ringwood, Major Co., 11-22n-10w	80.0	48.2	2&7					147.9			
Shell Western E&P Inc.—Elk City, Beckham Co., 15-10n-21w	4.5	3.4	3					4.9	5.0		
Sohio Petroleum Co.—Crescent, Logan Co., nw 34-17n-4w	45.0	33.0	6					168.0			
*Elmore, Garvin Co., 17-1n-2w	30.0	30.0	7		6.5		6.5			11.0	[5]45.0
Marshall, Garfield Co., nw 24-20n-4w	15.0	10.0	7					50.0			
Sun Exploration & Production Co.—Carney, Lincoln Co., 12-15n-2e	15.0	15.2	7						41.1		
Goldsby Central, McClain Co., 3-7n-3w	65.0	43.3	7						187.3		
Laverne, Harper Co., 20-26n-25w	200.0	92.4	6		41.8	11.4	24.3			32.1	[5]158.7 [11]6.4
Newcastle, Grady Co.	NR	9.4	2		7.1				7.6		
Wakita, Grant Co., 5-27n-7w	15.0	14.5	2						36.8		
Sun Gas Transmission Cl—Cushing, Payne Co., 15-18n-4e	3.0	1.7	3						1.2		
Stillwater, Payne Co., 16-18n-2e	3.0	0.6	3						0.8		
Tenneco Oil Co.—Ames, Major, 12-20n-10w	65.0	28.9	2						63.5		
Texaco Inc.—Apache, Caddo Co., 2-5n-12w	4.0	2.7	3					9.3			
Camrick, Beaver Co., 31-1n-20 ecm	14.0	12.0	7						26.3		
*East Velma Middle Block, Stephens Co., 1-2s-4w	30.0	22.1	2						26.0		
Enville, Love Co., 7-7s-3e	15.0	10.3	7	1.4	7.0	2.9				3.2	[11]0.9
Kellyville, Creek Co., ne 27-17n-10e	9.9	9.0	7						35.1		
*Velma, Stephens Co., 23-ls-5w	100.0	53.7	7						186.9		
Texas Oil & Gas Corp.—Antelope Hills, Roger Mills Co., 30-16n-24w	50.0	50.0	7						96.0		[11]0.7
Beaver Co., 9-1n-27e	75.0	32.0	7						63.0		[11]0.8
Cimarron, Blaine Co., nw4 24-18n-13w	90.0	69.0	7						154.0		[11]2.3
Custer Co., sw4 nw4 34-14n-16w	115.0	78.0	2&7						165.0		[11]0.6
El Reno, Canadian Co., nw4 sw4 33-14n-7w	75.0	58.0	7						168.0		[11]5.6
Jeffries, Major Co., sw4 nw4 19-23n-12w	20.0	6.0	2						6.7		
Watonga, Kingfisher Co., w2 se4 35-15n-9w	40.0	23.0	7						35.0		[11]1.3
Woodward Co., sw4 nw4 29-23n-21w	75.0	34.0	7						70.0		[11]2.5
Union Oil Co. of California—Caddo, Carter Co., 23-3s-1e	10.0	5.1	3		5.9				5.4		
Union Texas Petroleum Corp.—Chaney Dell, Major Co., 35-23n-10w	130.0	87.0	2&7						239.0		
Chester, Woodward Co., 2-20n-17w	9.0	5.0	6						11.0		
Edmond, Oklahoma Co., 32-14n-4w	15.0	7.0	7						24.0		
Piedmont, Canadian Co., 31-14n-6w	15.0	10.0	7						44.0		
Valero Hydrocarbons Co.—Red Bird, Wagoner Co., ne¼ se¼ ne¼ 14-16n-16e	4.0	2.3	7	0.7	1.4	0.3	0.9		1.1		
Tecumseh, Pottawatomie Co., ne4 29-10n-3e	14.0	NR	7	7.6	11.6	1.6	5.2		4.5		
Warren Petroleum Co.—Kingfisher Co., 11-15n-9w	NR	9.6	7						28.8		
Knox, Grady Co., 33-3n-5w	NR	15.6	2		4.0				11.8		[11]7.1
Leedey, Roger Mills Co., 32-16n-21w	NR	42.1	7						135.0		
Maysville, Garvin Co., 18-4n-2w	NR	63.8	7	105.7	5.1	8.7	33.4		112.8		[11]1.7
Mocane, Beaver Co., 18-5n-25e ecm	NR	49.0	2				23.5		90.1	16.4	
Total	**4,884.9**	**3,031.7**		**186.1**	**430.6**	**109.2**	**194.9**	**464.3**	**4,364.2**	**209.8**	**284.8**

¶N-butane and C_4+

TEXAS

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Adobe Oil Corp.—Sale Ranch, Martin Co., 23-37-1n	16.0	12.0	1						70.0		
Amoco Gas Co.—Texas City, Galveston Co., 1,814 acre tract in John Grant A-72	70.0	60.0	7	19.0		16.0					

Company, plant, location	MMcfd: Gas capacity	MMcfd: Gas through-put	Process method	Production—1,000 gal/day (Average based on the past 12 months): Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Amoco Production Co.—*Burnell-North Pettus, Bee Co., A-591	30.0	13.8	7	9.8	4.8	1.1	1.4			4.1	[10]1.1
Edgewood, Van Zandt Co., 2, Roberts A-702	60.0	17.6	2		10.8		16.4			7.8	[10]42.3
Hastings, Brazoria Co., 1-ACH-DA-416	78.1	71.4	7	6.7	4.8		5.3			14.0	
Luby, Nueces Co., Canutillo Colony Dutch Co.	20.0	15.2	7	8.2	4.6		4.0			5.8	
Midland Farms, Andrews Co., 842-T-T-N G&MMB&A	15.0	14.8	7						101.1		[11]0.4
Monahans, Winkler Co., 24-10 PSL	8.0	5.7	3						15.1		
North Cowden, Ector Co., 34-35-43-1M T&P RR	25.0	18.4	7		41.7		30.9			25.2	[5]55.8 [10]0.3
Old Ocean, Brazoria Co., Charles Breen League A-46	175.0	130.2	7	74.6	42.5	12.1	9.8			55.2	
Slaughter, Hockley Co., 14-15-59 Edwards & Scurry CSL	57.0	50.0	7		122.0		89.0			74.0	[5]210.0
South Fullerton, Andrews Co., 8-A 48 PSL	10.0	7.8	7						85.2		[10]0.2
*South Gillock, Galveston Co., John Sellers A180	37.5	28.0	2							7.9	[5]7.4
West Yantis, Wood Co., 3 Oscar Engledon A-181	20.0	10.4	2								[11]42.8
Anchor Gasoline Corp.—Tabasco, Hidalgo Co., nw corner of Tract 322, Las Ejidas de Reynosa Vieja Grant	67.0	NR	1					4.0		1.1	
Arco Oil and Gas Co.—*Block 31, Crane Co., 33-31 Univ. Lands	273.9	180.0	2&7	184.0	157.5		88.5			63.7	
Crane, Upton Co., 128-D CCS&RR Co	15.0	7.1	2	6.9	6.4	0.9	2.8			3.3	
Crittenden, Winkler Co., 24-C23-PSL	50.0	11.5	7	13.3	6.3	1.5	2.0			3.3	
El Dorado, Schleicher Co., 81-TT-TC RR	56.0	14.1	7	18.0	22.3	3.3	8.9		<0.1	7.0	[11]3.5
Fashing, Atascosa & Karnes Co., 131 Wm Smith	12.0	5.5	5		0.2		0.3			1.0	
Hull, Liberty Co., Wm. Smith A-342	18.0	1.3	2		1.0		0.7			1.0	[11]<0.1
Longview, Gregg Co., J. Moseley	35.0	8.9	7	41.1	62.9		42.7			30.9	[11]2.5
Midland Co., 17-40-4s T&PRR	12.0	7.2	3	4.7	5.8	0.9	2.7			2.7	[11]1.0
Nueces River, Live Oak Co., Cameron CSL 32-A-34	90.0	26.5	3		14.9		9.1			6.6	
Price, Rusk Co., George W. Brooks A-4	15.0	3.0	1		2.5		3.7			6.4	[11]0.3
Refugio Co	6.5	1.9	3	<0.1	<0.1	0.1	0.1			0.1	
Silsbee, Hardin Co., George W. Brooks A-4	50.0	3.2	7	9.5	8.4	2.2	2.8			3.6	
Taft, San Patricio Co., 48&48A Coleman Fulton Pasture Lands	40.0	15.3	2		3.0		2.4			3.2	[11]0.6
Arkla Inc.—Jefferson, Marion Co., Heirs of John Hanks A-188	3.5	1.1	5								[11]0.3
Waskom, Harrison Co., J. Blair	205.0	74.5	1		8.8	4.0	5.8			19.3	[3]0.3 [6]<0.1 [10]2.1
Willow Springs, Gregg Co., P. P. Rains	20.0	6.0	5							1.1	
Black Hawk Gasoline Corp.—Jack Co., R. Stanton, A-1329	2.0	1.0	3&4						<0.1	<0.1	
Breckenridge Gasoline Co.—Eliasville, Stephens Co., 1174 TE&L A-503	5.0	1.2	2						1.3		
Lodi, Cass Co., Wm. R. Meyer A-166	7.0	6.0	1						5.5		
Cabot Corp.—Arrington, Hemphill Co., 62-A-2 H&GNRR	40.0	20.0	2						32.3		
Carson Co., 4-5-I&GN	20.0	18.0	7						59.4		
East Goldsmith, Ector Co., 44-34, 1n,T&PRR	35.0	8.4	5&7						34.9		
Estes, Ward Co., 3-16 Univ. Land	15.2	11.5	7						76.3		
Gray Co., 152-3 I&GN	20.0	17.0	7						74.2		
Kingsmill, Gray Co., 152-3-I&GN	24.5	23.4	7						126.2		
Levelland, Hockley Co., 14-43, Rains County School Land	15.0	14.7	7						34.7		
Pampa, Gray Co., 96 B-2 H&GN	28.0	17.0	2		17.6			34.7	52.1		
Sweetwater, Nolan Co., sw corner 9 T&PRR Z D-438	150.0	77.5	7						87.3		
Walton, Winkler Co., 11-26 PSL	33.5	25.7	7						95.3		
Turkey Creek, Potter Co., 36-M20-G&M	60.0	27.3	2						79.5		
Yake-Merchant, Moore Co., nw corner of JW Procter survey	10.0	3.5	6						12.3		
Cal Gas Corp.—Live Oak Co., se part C&M RR No. 1131	15.0	17.2	7	3.1	13.1	3.3	4.1			7.4	
Strawn, Tom Green Co.	5.0	2.0	6	5.7	5.1	0.9	2.1			2.0	
Champlin Petroleum Co.—Bryan, Brazos	35.0	30.4	6						111.0		
Conger, Glasscock Co.	7.0	6.4	3						10.4		
Conroe, Montgomery Co	65.0	55.5	7						73.9		
East Texas, Panola Co.	340.0	290.3	7	282.6	124.7		92.1		168.3		
Gulf Plains, Nueces	135.0	72.5	7	79.2	34.0		21.2			50.9	
Lyons 1 & 2, Burleson Co.	35.0	23.0	3						92.2		
Tunis, Burleson Co	15.0	8.5	3						40.8		
Chevron USA Inc.—Kermit, Winkler Co., 12-B3 PSL	50.0	9.0	2		5.8		2.6			5.2	
Sherman, Grayson Co., A-121 Uriah Burns	33.0	16.0	2		10.0			10.7		5.3	
North Snyder, Scurry Co., 440-97 H&TC RR	46.0	26.0	3				19.4		87.5	26.8	[5]36.9
Cities Service Co.—Aspermont, Stonewall Co., Block D, Houston & Central RR	1.5	0.5	3						1.0		
Chico, Wise Co., 3 GH&HRR A-384	100.0	100.0	7						499.0		
Corpus Bay, San Patricio Co., Lot 9 Gregory subdiv. Geronimo Valdez A-269	35.0	27.0	2						36.0		
East Texas, Gregg Co., William Castleberry A-38	25.0	16.0	7					87.0			[5]121.0
*Ector Co., T&PRR 44-2s-28	4.0	2.0	7						4.0		
Gulf Coast fractionation, Chambers Co., H Henry Griffin, League A-12			†	(900.0)	(757.0)	(150.0)	(325.0)			(330.0)	
Lefors, Gray Co., 2-1-ACH&B	12.0	8.0	7						79.0		

	MMcfd			Production—1,000 gal/day (Average based on the past 12 months)							
Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
May, Kleberg Co., 12-5 Theo. F. Kochs first subdiv., Riviera Lands, Gabriel Trevion A-232	25.0	4.0	2						3.0		
Mont Belvieu fractionation, Chambers Co., Henry Griffin, League A-12			†	(930.0)	(740.0)	(127.0)	(323.0)			(254.0)	
Myrtle Springs, Van Zandt Co., J. Salingua A-765	30.0	10.0	2		3.0			7.0			
Panola Co., Matthew Parker A-527	50.0	5.0	2		1.0		1.0			1.0	
*Roberts Ranch, Midland Co., 16-41-3s T&PRR	85.0	67.0	7						104.0		
Robstown, Nueces Co., Puentecitas Andres de la Fuente A-III Simmons & Perry's subdiv. 7	8.0	5.0	8						3.0		
Stonewall Co., Elijah Boren A-831	21.0	5.0	1		15.0		8.0			8.0	
Welch, Dawson Co., 67-M of EL&RRRR	3.0	1.5	2						17.0		
*West Semirole, Gaines Co., 355 G CCDS&RGN GRR	38.0	28.0	7						114.0		
West World, Crockett Co., 19-Q-GCSFRR	15.0	1.0	2						5.0		
Conoco Inc.—Chittim, Maurice Co., 35-6	5.0	2.2	3						15.9		
Hamlin, Fisher Co., 9-R-26	14.0	10.4	7						92.5		
Port, Jefferson Co., Wm. McFaddin A-415, 36.9 acres in Port Acres	45.0	25.0	2	6.4	5.0		3.9			4.0	
Ramsey, Reeves Co., nw½ 36-58-1	10.0	6.6	6						16.8		
Damson Gas Processing Corp.—Brazos River, Young Co., J. Garrett			†	(1.0)	(17.0)		(8.0)			(9.0)	
Caddo, Stephens Co., 77 T&P RR 5	1.0	1.0	4						5.0		
Canadian, Hemphill Co.	3.0	1.3	3						2.0		
Cargray, Carson Co., 46-4 I&GN	30.0	14.1	7		20.0	6.0	16.0			10.0	[1]2.0 [2]8.0 [4]26.0 [12]1.0
Ibex, Shackelford Co., nw¼ 28 BAL	10.0	5.0	1		9.0		3.0			5.0	
Nueces, Tract 18, Map 153	30.0	12.0	2						21.0		
Ozona, Crockett Co., Block R TCRR	1.0	0.5	3						1.2		
Shackelford Co., nw 28 Bal	10.0	3.4	1		9.0		5.0			4.0	
South Bend, Young Co., J. Garrett	10.0	5.4	1		9.8		3.0			5.0	
Sterling Co., 10-22 H&TC	30.0	27.5							145.8		
Texon, Reagan Co., 12-2 Univ. Land	3.0	2.0									[11]0.5
Woodlawn, Harrison Co.	100.0	21.3	1						2.8		
Davis Gas Processing Inc.—Big Lake, Reagan Co., 8 miles e of Big Lake	11.0	7.5	2						42.0		
Bowie, Montague Co., 3 miles ne of Bowie	8.0	3.5	3		7.0				8.0		
Concho, Concho Co., 4 miles s of Paint Rock	10.0	3.0	2		3.0				3.0		
DeWees, Wilson Co., 10 miles sw of Floresville	2.0	0.5	3						1.0		
Irion (Rocker B-2), Irion Co., 8 miles n of Barnhart	16.0	8.0	2						48.0		
Kosciusko, Wilson Co., 1 mile n of Kosciusko	8.0	3.0	3						5.0		
Neleh, 5 miles sw of McCamey	6.0	3.5	2	(Gas processed at Shell's Tippett plant)							
Ozona, Crockett Co., 13 miles sw of Ozona	5.0	2.0	3						4.0		
Stiles, Reagan Co., 5 miles nw of Texon	8.0	4.0	2						24.0		
Delta Drilling Co.—Ozona, Crockett Co., nw¼-BMN GC&SFRR	60.0	15.0	2		20.0		10.0			5.6	[11]7.8
Diamond Shamrock Corp.—McKee, Moore Co., 399-44 H&TC	375.0	246.9	2&7		231.8	47.2	56.0		100.5		[5]435.0
Eagle Petroleum Corp.—Eagle-Thriftway, Young Co.	0.5	0.4	3						2.6		
Holliday No. 2, Archer Co.	1.5	0.4	3						1.8		
El Paso Hydrocarbons Co.—Benedum, Upton Co., w2 46 Y MK&T RR	90.0	74.1	7	85.3	52.1		23.4			14.7	
Foster, Ector Co., sw18-42-2s T&PRR	20.0	16.9	7	39.6	41.2		20.2			15.8	
Ranger, Eastland Co., John P. Rohus A-415	10.0	7.5	3	18.5	20.9		11.2			9.3	
Santa Rosa, Pecos Co., s2 105 8 H&GN RR	20.0	18.0	7	32.9	26.1		15.0			8.2	
W.D. Noel, Eastland Co., se4 30-3 H&TC RR	10.0	7.0	3	0.4	3.1		1.8			1.1	
W.D. Noel, Eastland Co., ne e2 ne4 31-3 H&TC RR	30.0	28.0	7	0.4	27.9		16.6			9.8	
El Paso Natural Gas Co.—Midkiff, Reagan Co., nw4 n2 sw4-22 T&PRR 37-5-5	168.0	71.6	1		95.6		75.8	161.0		62.8	
Wilshire, Upton Co., e2 ne4 ne4 & ne4 se4 ne4 135E CCSD & RGNG RR	30.0	19.7	4						3.2		
Endevco Natural Gas Co.—Bear Wallow, Brazoria Co., Oliver Jones A-78	35.0	30.0	7						44.5		[11]0.2
Cheyenne, Winkler Co., 15-L23 PSL	20.0	10.0	7						14.3		
Clarkson, Sutton Co., 48-14-TW&MG	20.0	20.0	7						23.4		
Iola, Grimes Co., RH Dunham A-184	35.0	30.0	7						56.2		[11]1.5
Enserch Exploration Inc.—Chico, Jack Co., J.U. Fields A-218	30.0	17.7	7						85.3		
Decatur, Wise Co., David Moses A-357	18.0	10.6	7						43.8		
Gilliland, Knox Co., C of H&TC RR	14.0	5.8	3						7.3		
Gordon, Palo Pinto Co., Thomas Reed A-384	50.0	44.1	7						160.0		
Madisonville, Madison Co., Alfred Gee A-16	20.0	19.4	5						2.2		
Novice, Coleman Co., T&NO RR Co. 24-2	4.5	3.5	3						3.4		
Pueblo, Eastland Co., SPRR-464	20.0	17.3	7						77.5		
Ranger, Eastland Co., H&TC RR 4-4	17.9	13.0	3						57.1		
Red Oak, Leon Co., A. T. Kerr A-455	10.0	2.2	4						0.3		
Santa Anna, Coleman Co., Mary Ann Fisk 630, A-195	5.0	4.4	3						2.4		
Springtown, Parker Co., J. L. Hodges A-690	80.0	46.9	7						175.8		
Trinidad, Henderson Co., No. Addison A-17	65.0	64.4	7						111.8		
Weatherford, Parker Co., A. Bieless A-2732	30.0	7.1	7						30.2		
Etexas Producers Gas Co.—Chapel Hill, Smith Co., Stillwell Box A-169	35.0	30.0	7		21.6		15.0			18.8	

Company, plant, location	Gas capacity (MMcfd)	Gas throughput (MMcfd)	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
				Production—1,000 gal day (Average based on the past 12 months)							
Exxon Co.—Anahuac, Chambers Co., H&TCRR, 51 A-112	293.0	107.0	2						58.3		
Clear Lake, Harris Co., James Lindsey	200.0	146.0	2	67.1	31.0				42.7		[11]1.5
Conroe, Montgomery Co., Random House	122.0	144.0	2&7						118.8		[11]0.9
East Texas, Rusk, T. J. Martin	25.0	9.3	3						53.2		[5]50.4
Hawkins, Wood Co., H. Watson	150.0	129.0	2&7				54.1			70.7	[5]73.8
Heyser, Calhoun Co., Agaton Sisneros A-36	30.0	31.7	7						29.4		[11]0.6
Katy, Waller Co., T. S. Reese 110, A-332	1,260.0	449.0	2						208.0		[5]558.6
Kelsey, Brooks Co., La Blanca A-459	155.0	29.4	2						58.5		[11]2.1
King Ranch, Kleberg Co., R. King A-172	925.0	615.8	2	354.3	195.7	69.3	59.4			157.3	[11]8.2
Neches, Cherokee Co., J. H. Shaw	40.0	30.0	2						70.7		
Pyote, Ward Co., 32-16 ULS	100.0	31.0	7						37.1		[11]0.1
Sand Hills, Crane Co., 18-32 PSL	65.0	46.0	7						189.3		
Santa Fe, Brooks Co., San Salvador del Tule A-290	35.0	7.0	2						6.6		
Sarita, Kenedy Co., J. A. Balli A-2	95.0	66.3	7						85.6		
Thompson, Fort Bend Co., John Rabb	30.0	24.0	7						10.7		
Tomball, Harris Co., C. Goodrich	80.0	36.0	2						32.7		[11]1.9
Tom O'Connor, Refugio Co., Maria Ximines A-324	165.0	140.9	7						194.3		[11]9.7
Farmland Industries Inc.—Bailey, Schleicher Co., 522-TT	15.0	10.0	7						50.0		
Eldorado, Schleicher-Irion-Reagan Cos., 33-M-GH&SA	30.0	22.0	7						106.0		
Mertzon, Schleicher-Irion Tom Green Cos., Tom Green CSL-1	32.0	20.0	7						110.0		
Quitman, Wood Co., S.G. Purse A-456	10.0	2.8	2						15.0		
Fort Chadbourne Corp.—Box Elmdale, Callahan Co., 4 miles e of Abilene	4.0	2.0	3						4.0		
Tuscola, Taylor Co., 2 miles w of Tuscola	4.0	2.0	3						4.0		
Gerlane Petroleum Co.—Mobeetie, Wheeler Co., 1 mile w of Mobeetie	12.0	3.0	2						6.0		
Glen L. Martin—McLean-Bowman B, I&GN RR 55 A-275 Block 2, Dimmit Co.	1.0	0.4	3						1.2		
Gulf Energy Development Co.—Borger mini plants in Carson County:											
No. 3, 86-5 I&GN	1.0	0.8	3							0.5	
No. 4, 100-5 I&GN	2.0	1.3	3							0.9	
No. 5, 94-5 I&GN	2.0	1.7	3							1.0	
No. 9, Hutchinson Co., 122-5 I&GN	2.5	0.7	3							0.8	
No. 10, 99-5 I&GN	1.0	0.7	3							0.6	
No. 11, 83-5 I&GN	2.0	0.5	3							0.5	
No. 13, 83-5 I&GN	1.0	0.5	3							0.7	
No. 14, 84-5 I&GN	1.0	0.6	3							0.4	
No. 17, 67-5 I&GN	1.5	0.5	3							0.5	
Gulf Energy Processing Corp.—Palo Pinto Co., J.H. Brown A-1092	12.0	10.4	7					22.0			
Rio Grande City, Starr Co., Share 24C, Portion 85, Camargo	38.0	33.3	2		1.8		1.4			1.1	
*Rio Grande Dry Bed, Starr Co., Share 24C, Portion 85, Camargo Jurisdiction	140.0	100.0	5								[11]0.2
*Runge, Karnes Co., Cabeza Creek area, Ramon Musquiz A-8	52.0	31.0	2					70.7			
HNG Gas Liquids Inc.—Encinal, Webb Co.	35.0	27.0	6						26.0		
Gregory, San Patricio Co., Geranimo Valdez A-269	70.0	32.0	2		21.0		14.0				
Liverpool, Brazoria Co., Day Lane & Cattle Co., A-601	42.0	12.0	2						8.0		
McMullen Co.	15.0	7.5	3		13.0			20.0			
Robstown, Nueces Co., Mathis Garcia A-116	76.0	76.0	2	13.0	25.0		30.0			14.0	
Seven Oaks, Polk Co.	25.0	17.0	7							3.0	
Sonora, Sutton Co., HE&WT RR A-352	50.0	50.0	2						75.0		
Tuleta, Bee Co., Brooks & Burleson	40.0	16.0	1					13.0		11.5	
Victoria Co., James Reed A-236	75.0	30.0	2				20.0				
Houston Oil & Minerals Corp.—Giddings, Lee Co., J. Vashary League A-329	5.0	3.5	3						8.4		
Madisonville, Madison Co., John Talbert A-30	1.0	0.8	4						1.2		
Smith Point, Chambers Co., E. T. Branch A-40	105.0	38.0	5							6.6	
South Liberty, Liberty So., E. Munson League A-88	18.0	10.0	3						2.0		
Texas City Dike, Galveston Co., T. G. Western A-204	50.0	17.0	7						17.6		[5]20.0
Hunt Oil Co.—*Fairway, Henderson Co., Jose Mora A-497	87.5	69.0	2						182.7		
*Pecos Valley, Pecos Co., 106-T&ST-L	10.0	3.0	3						3.0		
Kerr-McGee Corp.—Hobart Ranch, Hemphill Co., 70 A-2 N&GN	43.5	NR	7						66.3		
Pampa, Gray Co., 163-3 I&GN	24.0	NR	2						38.0		
Koch Hydrocarbon Co.—Sterling Co., 141-2 H&TC RA	5.0	2.9	3						14.5		
Ladd Petroleum Corp.—Southwest Ozona, Crockett Co., 2-2 I&GN RR	26.0	14.8	2						61.9		
Mapco Inc.—Bivins, Moore Co., 33-PMc, ELRR	100.0	5.2	2						11.3		
Fritch 950, Hutchinson Co., 92-Y2-TTRR	60.0	50.5	2						175.6		
Fritch 1000, Hutchinson Co., 92-Y2-TTRR	145.0	33.7	2						83.0		
Marathon Oil Co.—Markham, Matagorda Co., 4-9-9	21.0	20.3	3					5.0			
Susan Peak, Tom Green Co., 193 SPRR-11	3.3	2.9	3		3.0			3.0			
Welder, San Patricio Co., 49 Robert Montogomery 199 and Ewan Cameron A-97	55.0	12.2	1						2.7		
Yates, Pecos Co., I.G. Yates, 194 SF 1234-1	25.0	22.6	2		6.3			16.5			

	MMcfd			Production—1,000 gal/day (Average based on the past 12 months)							
Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
MidCon Texas Pipeline Corp.—Flatrock Creek, Young Co., M. Case A-1402	13.0	9.0	2						20.0		
Graham, Young Co., TE&L Co., 3412 A-1232	8.0	4.0	2						10.0		
Markley, Archer Co., A. Rohgus A-240	2.0	1.0	2						1.5		
Olney, Archer Co., S.G. Hardaway, A-164 BB&PC RR A-54	1.3	0.3	2						3.5		
Mills Bennett Estate—Brooks Co., El Tule Grant A-257	8.0	2.0	3					1.3			
Mitchell Energy & Development Corp.—											
Barton Chapel 1, Jack Co.	15.0	16.6	7						60.1		^{11}2.0
Barton Chapel 2, Jack Co.	20.0	2.5	7						9.0		^{11}0.3
Brent Ranch, Moore Co.	20.0	12.2	7						44.8		^{11}8.3
Bridgeport 1, Wise Co.	150.0	115.7	7		133.3	23.1	20.6		331.5	63.2	^{11}3.6
Bridgeport 2, Wise Co.	20.0	15.4	7		17.8	3.1	2.8		44.2	8.4	^{11}0.5
Bridgeport 3, Wise Co.	20.0	15.4	7		17.8	3.1	2.8		44.2	8.4	^{11}0.5
Bryan Hicks, Brazos Co.	20.0	12.6	7						61.8		
Canadian River 1, Hutchinson Co.	20.0	8.6	7						45.4		^{11}3.9
Canadian River 2, Hutchinson Co.	20.0	0.7	7						3.4		^{11}<0.1
Cisco, Eastland Co.	15.0	12.5	7						48.6		^{11}1.8
Cottonwood, Callahan Co.	15.0	4.8	7						7.9		
Falfurrias No. l, Brooks Co.	20.0	17.7	7						11.9		^{11}0.1
Gibtown, Jack Co.	15.0	11.8	7						51.2		^{11}2.1
Gum Island, Jefferson Co.	40.0	0.8	7						1.0		
Huckabay No. 1, Erath Co.	15.0	11.6	7						46.3		^{11}0.5
Huckabay No. 2, Erath Co.	15.0	11.6	7						46.3		^{11}0.5
Huckabay No. 3, Erath Co.	15.0	11.6	7						46.3		^{11}0.5
LaSal Vieja, Willacy Co.	15.0	3.3	7						4.1		
Live Oak Co.	20.0	11.0	7						21.0		^{11}<0.1
Lone Camp No. 2, Palo Pinto Co.	10.0	7.1	7						28.7		^{11}0.3
Lone Camp No. 3, Palo Pinto Co.	10.0	7.1	7						28.7		^{11}0.3
Lone Camp No. 4, Palo Pinto	30.0	21.6	7						86.2		^{11}0.9
Madisonville No. 1, Madison Co.	5.0	2.2	6						2.2		
Madisonville No. 2, Madison Co.	5.0	2.2	7						2.2		
Mineral Wells, Palo Pinto Co.	15.0	10.3	7						42.2		^{11}1.2
Morgan Mill No. 1, Erath Co.	15.0	9.8	7						30.4		^{11}0.2
Morgan Mill No. 2, Erath Co.	15.0	9.8	7						30.4		^{11}0.2
Morgan Mill No. 3, Erath Co.	20.0	13.0	7						40.6		^{11}0.3
Ponder, Denton Co.	2.0	2.4	6						6.6		^{11}0.1
Port Arthur, Jefferson Co.	115.0	74.1	7						86.1		
Ranger No., Eastland Co.	10.0	6.3	7						27.1		^{11}0.6
Rockdale, Milam Co.	20.0	5.7	7						27.5		
Schreiner Ranch, Live Oak Co.	20.0	13.9	7						32.4		^{11}0.3
Seven Oaks, Polk Co.	20.0	10.0	2						22.3		
Springtown, Parker Co.	15.0	12.1	7						33.1		^{11}0.1
Wellborn, Brazos Co.	5.0	2.0	3						4.9		
Winnie, Jefferson Co.	75.0	36.5	7						41.5		
Worsham Steed, Jack Co.	30.0	7.7	7						11.8		^{11}0.1
Mobil Producing Texas & New Mexico Inc.—											
*Coyanosa, Pecos Co., 48-OW TTRR	140.0	105.0	7					16.7	144.6		^{11}66.9
East White Point, San Patricio Co., G.H. Paul subdiv. of Coleman Fulton Pasture Lands	25.0	11.8	7						24.4		
Electra, Wilbarger Co., 17-13 H&TC RR	1.2	0.8	3						12.6		
Hagist, Duval Co., BS&F 267	35.0	13.5	1						13.0		
LaGloria, Jim Wells Co., 9-3 Rangeland 7 Herring subdiv. LaGloria Townsite subdiv.	320.0	200.0	7	182.0	82.0	26.0	21.0			54.0	^{11}6.1
*Lake Creek, Montgomery Co.	5.5	4.1	7	1.5	2.2	0.6	1.0			1.4	
*Pegasus, Midland Co., e2 30-40-4s T&PRR	90.0	84.0	7	77.7					165.9		
*Portillo, San Patricio Co., M. S. Welder	15.0	13.8	2	4.0	4.1	1.5	1.8			5.3	
Sabine Pass, Jefferson Co., F. C. McReynolds 126 A-432 T&NO RR, 127 A-245, John McGaffey A-167	200.0	85.0	7						90.9		
Salt Creek, Kent Co., W&NW RR G-193	28.0	12.7	3						131.7		
Vanderbilt, Jackson Co., R. Musquex A-59	56.7	89.1	2								^{5}6.4 ^{9}0.3 §13.3
Waha, Pecos Co., 5-C3 PSL	125.0	54.0	7						117.6		^{11}1.7
Wilcox, Lavaca Co., J.R. Ragsdale A-377	235.0	119.0	2	18.4	18.3		12.0			12.0	
Monsanto Co.—Diamond M, Scurry Co., se¼ 182-97 H&TC	18.0	13.0	6	43.2	58.2	8.0	23.4			22.6	^{11}0.9
Natural Gas Pipeline Co. of America—											
*PP 161, Hutchinson, 5-Y2 TTRR	240.0	10.5	5							4.6	
CP 170, Moore Co., w½ of nw¼ section 1 of TTRR	80.0	60.0	7							200.0	
Northern Gas Products—Imperial, Crane Co., 20&21 1 H&TC RR-1	18.0	13.4	6&7						49.7		
Lipan, Hood Co., J.R. Anderson A-11	15.0	8.4	6&7						31.2		
Martin Co. No. 1, 31-37-2n TYP RR	10.0	8.2	3					41.4			
Martin Co. No. 2 4-HA	5.0	3.5	3						18.1		
Middle Concho	10.0	5.0	6&7	7.4	5.2	0.7	1.6			1.4	
Shackelford, 14-3 H&TC RR	2.0	1.2	3						3.7		
Parade Co.—Giles, Rusk Co.	3.0	1.3	3						17.0		
Permian Corp.—Possum Kingdom, Stephens Co., E. Romerhausen A-149	5.0	2.5	3						5.0		
Todd, Crockett, 28-WX GC&SF RR	5.0	2.5	3						10.0		
Perry Gas Products Inc.—Perry-LaGrange, Fayette Co., Wm. Rabb 3 League A-86	100.0	47.0	7						206.8	18.3	
Phillips, Jack L.—Nan Su Gail, Freestone Co.	7.0	1.0	3						1.5		
Phillips Petroleum Co.—Birthright, Hopkins Co., Linecum A-561 and Hargrave A-426	15.0	NR	3		7.6				15.5		
Crane Co., ne4 216-F CCSD&RGNG RR	20.0	NR	7								
Dumas, Moore Co., nw4-181-44 H&TC	120.0	NR	7								
East Chapa, Live Oak Co., Chapa A-697	50.0	40.6	7						65.2		

Company, plant, location	MMcfd Gas capacity	Gas throughput	Process method	Production—1,000 gal/day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Fullerton, Andrews Co., Center S-17 A-32 PSL	55.0	NR	7								
Giddings, Fayette Co., David G. Green A-193	75.0	NR	7								
Goldsmith, Ector Co., nw4-se4-33-44 T&P-1n	370.0	NR	7								
Gray Co., e2-32-2 H&GN	74.0	NR	2								
Hansford Co., 7&8-1 PSL	170.0	NR	1								
Henderson, Rusk Co., sw portion A.H. Crain-Anderson Tract	20.0	NR	1								
Luling, Caldwell Co., north corner John Henry A-12	12.0	NR	7								
Pantex, Hutchinson Co., 8&9 M. Whitley	20.5	NR	7								
Puckett, Pecos Co., n2 26-101 TCRR	250.0	NR	5								
Quarry, Washington Co., Nelson-Whitehead A-108	75.0	NR	7								
Rock Creek, Hutchinson Co., nw4-22-y A&B	180.0	NR	7								
Sherman, Hansford Co., 7&8-1 PSL	340.0	NR	7								
Sneed, Moore Co., w2-nw4 Freeman Brazemore	250.0	NR	1								
Spraberry, Midland Co., se4-25 3s-37 T&P	25.0	NR	7								
Pioneer Gas Products Co.—Fain, Potter Co., G&M 10-181B	80.0	75.8	7					252.2			
Pronto Gas Co.—Archer City, Archer Co.	1.0	0.3	3	0.2	0.5	0.1	0.2		1.3		
Clyde, Callahan Co.	0.5	0.1	3	0.1	0.2	<0.1	0.1		0.5		
Newcastle, Young Co.	0.5	0.2	3	0.2	0.7	0.1	0.3		1.6		
Novice, Coleman Co.	2.0	1.0	3								
Wali, Tom Green Co.	0.8	0.5	3	0.6	1.2	0.2	0.5		3.1		
Seagull Products Co.—Matagorda Co., Lot 29 Moore Pasture subdivision	250.0	109.0	7						58.0		
Shell Western E&P Inc.—*Bryans Mill, Cass Co., B.F. Lynn A-651	70.0	52.0	2		27.5					39.0	
Conley, Hardeman Co., sw4 80-H WN&W RR	2.0	1.1	3		0.7		1.8			0.5	
Eustace, Henderson Co. Vincente Michelli A-485	70.0	45.5	7						169.0		[11]48.1
Houston Central, Colorado Co., F. Mayhar A-400 K. Winn A-589	285.0	84.1	2	100.3	52.8	13.4	16.3			22.9	[11]27.8
NW Ozona, Crockett Co., ne4 46-OP GC&SF RR	10.0	4.8	3					11.4	3.8		
Person, Karnes Co., Jesus Hernandez A-140	54.0	7.0	2		4.0		3.0			2.9	[11]0.9
Tippett, Crockett Co., 38-31-H&TC RR	55.0	26.1	6	41.9	25.8				24.8		
TXL, Ector Co., 17-45-1s T&P RR	40.0	24.8	2	53.4	51.5		23.2			21.0	
Wasson, Yoakum Co., nw¼ 827 sw¼ 802-D John H. Gibson	150.0	69.8	2	150.6	185.4				235.1		
Sid Richardson Carbon & Gasoline Co.—Chalk, Cottle Co., nw¼ of C.L. Carter FP 4480	12.0	3.2	3						5.3		[11]0.1
Eskota, Fisher Co., 11 T&PRR-19	12.0	8.0	6						73.7		[11]0.8
Halley, Winkler Co., e2-22-B11-PSL	60.0	41.0	7						124.6		[11]1.3
Keystone, Winkler Co., 5-B2 & 1&2 B3-PSL	120.0	107.5	7						238.9		[11]1.4
Sterling Co., 11 acres 2-31-5s T&P RR	40.0	29.3	7						122.3		
Southwest Forest Gas Gathering Co.—Rocker B 1, Reagan Co., 17 miles ne Big Lake	16.0	6.0	7						36.0		
SPG Exploration Corp.—Martha F. Berry, Frio Co., M.C. Patton, 1178 A-542	5.0	3.3	6						8.0		
Sun Exploration & Production Co.—Big Wells, Dimmitt Co., I&GN A-223 82-1	20.2	10.3	2		6.8		4.5			2.7	
Jameson, Coke Co., 315-1A N&TCRR	70.0	42.2	6&7		48.5		48.8			41.0	[5]215.2
Jupiter, Jack Co., A.J. Tivis A-607	3.0	1.0	3						2.9		
Kurten, Brazos Co., James Simpson A-208	35.0	18.5	2						39.0		
Red Fish Bay, San Patricio Co., R.W. Williamson	140.0	25.8	2					17.3	3.9		[11]0.6
Snyder, Scurry Co., 16-1 JP Smith	150.0	56.1	3		141.8		99.9			112.2	[5]299.3
Sun, Starr Co., 239 AB-225 CCSDR RGN GRR	92.0	65.1	2		24.8		18.7			31.8	[5]35.4
Tijerina-Canales, Jim Wells Co., 343 CCSD&RGNG	40.0	21.6	2		8.4		6.8			4.8	[5]17.9
Tenneco Oil Co.—Chesterville, Colorado Co., Thomson A-708	55.0	13.2	2		9.8	2.6	3.1			4.0	
L.L. Leabo, Matagorda Co., sw¼ 17 Rynd Larder A-351	95.0	6.0	2						9.1		
O.W. Ward, Hidalgo Co., Porcion 68, Gregario Comancho A-28	140.0	44.4	2		9.1		7.6			11.0	[7]1.0
Texaco Inc.—Blessing, Matagorda 59-C, J.E. Pierce sub H&GN	75.0	12.2	2		1.4		0.6	2.8			
Bradford Ranch, Midland Co., 13-39-3s, T&P RR	12.5	12.5	7						60.0		
Burleson Co., J. P. Coleson A-12	60.0	12.5	7						38.8		
Burnett Ranch, 83-5 I&GN	15.0	5.9	3						18.0		
Constitution, Hardin Co., Keeton M. Jones A-583	5.0	1.5	7						4.3		
East Vealmoor, Howard Co., 20-27-H&TC	50.0	33.2	7		75.5	13.7	43.9			45.4	[5]136.8
El Paso, Carson Co., 88-4-1n I&GN RR	150.0	65.7	2						22.0		
Encinitas, Brooks Co., nw 14 San Antonio Grant A-214	32.0	5.9	2						14.6		
Fuller, Scurry Co., ne¼ 652-97 H&TC RR	5.0	3.7	3		17.3				28.2		
George West, Live Oak Co., G.W. West sub D 200&201	23.0	22.3	7						64.7		
Handy, Grayson Co., se¼ I&GN RRA-1441	12.0	0.9	2						7.5		
*Headlee Devonian, Ector-Midland Co., ne¼ of nw¼ 29-41-2s T&PRR	190.0	177.0	6	252.6	85.1	9.5	29.4			43.2	
Humble, Harris Co., J. B. Stevenson Fee A-703, B-4	4.0	0.7	6						3.1		
Lamesa, Dawson Co., se ¼ 36-34-5n T&PRR	6.0	3.2	3		2.6				3.7		
Mabee, Andrews Co., s¼ 32-40-2n, G&MMB & A	5.0	3.0	6						13.0		

Company, plant, location	MMcfd Gas capacity	MMcfd Gas throughput	Process method	Production—1,000 gal day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Masterson, Potter Co., 8-G&M 3	10.0	1.3	3						5.8		
New Hope, Franklin Co., Isaac Barre A-20	50.0	23.0	2		4.0		6.0				
Normanna, Bee Co., Thomas Duty A-21	6.0	NR	3				<0.1			<0.1	<[5]0.1
Odem, San Patricio, Juan Hart & Sons A-10 J. F. Welder Tract	23.0	17.0	7						22.4		
Ozona, Crockett, n½ 3-MN, GC&SF RR	25.0	12.3	7						47.0		
Pangaea-Bivins, Potter Co., sw4 22-0-18 D&P	10.0	2.0	3						5.0		
Schafer, Carson Co., 88-4-1n I&GN RR	62.0	57.0	2&6	36.1	64.8	18.6	47.5			60.7	[11]2.3
South Kermit, Winkler Co., sw¼ 22 B-3, PSL	42.0	13.4	2		7.6				9.3		
Spearman, Ochiltree Co., 23-R-B&B	50.0	30.0	2		10.4				9.8		
Streetman, Freestone Co., A-536, Jefferson Richards	8.0	4.6	3						14.7		
Tijerina, Jim Wells Co., A. Canales 300 A-79	50.0	8.7	2				2.3				[5]12.3
Watkins, Hutchinson Co., 13 M31 T&C RR	20.0	7.1	2						30.9		
Texas Oil & Gas Corp—Booker, Lipscomb Co., w2-sw4 1116-43 H&TC RR	6.0	6.0	3						6.0		[11]0.5
Coyanosa, Pecos Co., 18-143-T&SL RR	75.0	66.0	7						139.0		[11]0.6
Denton Co., BBB&CRR A-161	30.0	13.0	2						39.0		
East Texas, Marion Co., John H. Kernels A-236	75.0	46.0	7		23.0		19.0			20.0	[11]1.5
Grapeland, Houston Co., 2 JDJ Procella League A-69	125.0	119.0	7						104.0		[11]0.6
La Paloma, Kenedy Co., Santa Rosa de Arriba Pedro de la Garza A-36	20.0	14.0	7						27.0		[11]0.1
Laredo, Webb Co., Porcion 14 of N.D. Hachar Estate	30.0	20.0	2					17.0		5.0	[11]0.4
Longview, Gregg Co., Frost Thorn A-5	100.0	37.0	7						20.0		[5]48.0 [11]0.1
Shackelford, Callahan Co., nw corner 24 sw corner 23 Bayland Orphan Home Land	30.0	16.0	2						45.0		[11]3.0
Three Rivers, Live Oak Co., J.D. Jamison 168 A-268	25.0	24.0	7						64.0		[11]1.5
Tipperary Corp.—Claytonville, Fisher Co., 211-3 H&TC RR	2.0	4.0	2						31.0		
Peach Creek, Lavaca Co., A-32	15.0	3.5	7						12.0		
Pearsall, Frio Co., 1-A-307 Henry Castro	8.0	3.1	2						12.0		
Union Oil Co. of California—Dollarhide, Andrews Co., 25-A52-PSL	13.0	16.5	6						58.4		
*Fort Trinidad, Houston, Co., RCS A-23	40.0	8.5	2		5.8		4.0		3.7		
Van, Van Zandt Co., JWS A-891	15.0	7.3	2		6.2		8.7			10.1	
Union Texas Petroleum Corp.—Benedum, Upton Co., 3-G. Bendel	80.0	22.0	7						136.0		
East Sour Lake, Hardin Co., 384 A-784 J.F. Keith	20.0	15.0	7						25.2		
Perkins, Coke Co., 2-H&TC RR	26.0	25.0	7						162.0		
Walnut Bend, Grayson Co., 59 Fannin CSL	12.0	5.0	7						45.0		
Wellman, Terry Co., 12 PSL	6.0	4.0	7						50.0		
United Texas Transmission Co.—Galveston Bay, Chambers Co., J. Armstrong A-2	40.0	22.4	7						16.9		[11]0.4
Upham Oil & Gas Co.—Bridgeport, Wise Co., Wm. Hersee	10.0	6.0	2		7.5		5.5			5.0	
Valero Hydrocarbons Co.—Armstrong, DeWitt Co. James A. Moody A-333	400.0	251.8	7	151.8	80.7	19.2	24.4		34.0		
Bel Junction, Hidalgo Co., TexMex RR A-211	90.0	63.7	7	55.0	21.2	7.8	6.2		14.3		
Fort Stockton, Pecos Co., 3-OW, F.M. Hoffman	7.5	4.1	7	7.8	6.6	1.0	2.1		1.8		
Freer, Webb Co. BS 1-4 A-1954	190.0	89.3	2	9.8	27.3	8.6	7.6		13.9		
Garden City, Sterling Co., 30-22, A-698 H&TC RR	40.0	30.7	6	58.7	51.9	6.0	15.9		11.2		
San Antonio, Bexar Co. 4010 F. Farias 15 A-2	150.0	121.1	7	64.9	56.6	14.7	20.2		24.3		
Shoup, Nueces Co., AB&M 409 A-555	300.0	255.2	7	146.0	77.2	27.3	22.7		42.1		
Sonora, Sutton Co., 122, HE&WTRR A-1117	40.0	36.4	7	41.3	27.0	4.3	8.3		9.0		
Sutton Co., 14-13 HE&WT A-1586	20.0	15.6	7	20.8	16.8	2.4	5.1		4.3		
Warren Petroleum Co.—Breckenridge, Stephens Co., n2 22 LAL	NR	11.5	7						50.6		
Canadian, Hemphill Co., 216 G&MMB&A-C	NR	8.1	7						24.2		
Como, Hopkins Co., Nacogdoches Univ. A-703	NR	2.1	2		2.1		1.6		2.6	0.7	
Encinal, San Patricio Co., 18 of George H. Paul subdiv of Coleman Fulton Pasture lands	NR	0.3	2						0.5		
Fannett, Jefferson Co., Marrs McLean Tract in Wm. H. Smith League A-198	NR	17.0	2						10.7		
Fashing, Atascosa and Karnes Cos., Emma Tar H. et al. tract in James Wilkerson 149 A-882	NR	45.0	2		9.6		5.6		13.8	11.3	
Gladewater, Gregg Co., David Ferguson	NR	7.6	7						115.9		
Gruver, Hansford, sw4 5-WDC Hall	NR	4.7	7						10.7		
McLean, Wheeler Co., 33-24 H&GN RR	NR	9.4	6						48.7		
Miami, Roberts Co., se4 36-B1-H&GN RR	NR	6.4	7						20.7		
Monahans, Ward Co., 4-F	NR	31.1	7						70.7		
Moores Orchard, Fort Bend Co., German Emigration No. 8	NR	9.7	7						15.6		
Sand Hills, Crane Co., 21-PSL B-21	NR	115.7	2&7						423.0		
Shackelford Co., TE&L 522 & 523	NR	8.9	7						51.3		
Sherman, Grayson Co., James S. Coffee A-232	NR	0.2	7						5.9		
Spear, Gregg & Rusk Co., Mary Van Winkler	NR	1.7	7						22.0		
Terry Co., 6-D-14 C&M RR	NR	0.6	3						2.6		
Tolar, Hood Co., Lewis Boatright A-33	NR	1.1	7						5.6		
Tonkawa, Hemphill Co., 78-41 H&TC RR	NR	3.2	7						9.7		

	MMcfd			Production—1,000 gal/day (Average based on the past 12 months)							
Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Worsham, Ward Co., 56-34 H&TC RR	NR	8.1	7						14.5		
WilGas Co.—A&M, Burleson Co., John P. Coles A-12	65.0	33.0	3&7						167.6	21.1	
La Grange, Fayette Co., James Green A-189	200.0	95.0	7						439.4	14.1	
WW Sub Inc.—*Markley, Jack Co., SPRR A-583	2.0	1.0	3						3.5		
Total	**21,071.0**	**12,527.3**		**2,910.6**	**3,294.6**	**384.4**	**1,543.0**	**814.7**	**13,140.6**	**1,829.1**	**2,721.5**
UTAH											
American Quasar Petroleum Co.—Pineview, Summit Co., 3-2n-7e	15.0	3.7	3&7		8.9				19.6		
Champlin Petroleum Co.—Yellow Creek, Summit Co. 16-3n-8e	80.0	55.9	7		56.8				51.5		
Chevron USA Inc.—Red Wash, Uintah Co., ne4 21 nw4 22-7s-23e	38.0	9.0	3							2.8§	
El Paso Natural Gas Co.—Aneth, San Juan Co., nw4-6-41s-24e	100.0	13.4	1		8.7				65.4		
Gary Refining Cl.—Altonah, Duchesne Co., sw-nw 5-2s-3w	12.5	3.0	3		2.8		2.7			2.3	
Bluebell, Duchesne Co., sw-nw 23-1s-2w	23.0	13.9	2		17.4				28.4		
Koch Hydrocarbon Co.—Cedar Rim, Duchesne Co., 21-3s-6w	12.0	5.6	3		3.0		3.9			5.9	
Marathon Oil Co.—Tin Cup Mesa, San Juan Co., 25-38s-25e	NR	0.8	3						3.7		
Mountain Fuel Supply Co.—Price, Carbon Co., 8-14s-10e	120.0	99.3	3						4.7		
Union Oil Co. of California—*Lisbon, San Juan Co., 22-30s-24e	80.0	53.7	3		23.0		16.6			17.0	
Utex Oil Co.—*Altamont, Duchesne Co., 34-1s-4w	40.0	10.0	3		8.0		7.5			17.0	
Total	**521.5**	**268.3**		....	**128.6**	....	**30.7**	....	**173.3**	**45.0**	....
WEST VIRGINIA											
Columbia Gas Transmission Corp.—Cobb, Kanahwa Co., Big Sandy district	35.0	32.5	2						48.6		
Kenova, Wayne Co., Ceredo district	170.0	104.8	2						167.0		
Consolidated Gas Transmission Corp.—Hastings, Wetzel Co.	150.0	112.6	3	213.3	126.1	21.1	40.8		38.0		
Gulf Energy Processing Corp.—Copley Run, Lewis Co.	40.0	26.6	7					34.2			
Schultz, Pleasants Co.	10.0	9.4	1					25.3			
Pennzoil Exploration and Production Co.—11 small plants	11.0	6.0	4							1.5	
Total	**416.0**	**291.9**		**213.3**	**126.1**	**21.1**	**40.8**	**59.5**	**253.6**	**1.5**	....
WYOMING											
American Quasar Petroleum Co.—Spearhead, Converse Co., w2-13-29n-75w	20.0	3.8	2						11.5		
Amoco Production Co.—Bairoil-Wertz, Sweetwater Co., 7-26n-90w	5.0	2.7	3		4.0					11.5	
Beaver Creek, Fremont Co. 10-33n-96w	65.0	27.2	3		12.1		11.1			9.7	
Elk Basin, Park Co., 29-48n-99w	18.0	10.8	2		16.2		16.3			18.5	
Ryckman Creek, Uinta Co., e2-13-17n-119w-6pm	22.1	15.0	3						36.3		
Whitney Canyon, Uinta Co., 17-17n-119w	270.0	193.5	7						171.9		[11]174.5
Arco Oil & Gas Co.—Gillette, Campbell Co., 18-50n-73w	31.0	7.3	3		18.6		11.0			8.5	[11]0.4
Laramie Co., 31-16n-74w	1.0	NR	3						1.6		
Riverton Dome, Fremont Co., 36-1s-4e	30.0	9.7	2							2.4	[11]1.1
Big Horn Fractionation—Amos Draw, Campbell Co., se¼ nw¼ 32-51n-75w	30.0	6.9	3						22.8		[11]1.5
Rozet, Campbell Co., 4 sw4 18-50n-69w	0.5	<0.1	3		9.5		13.7				
Champlin Petroleum Co.—*Brady, Sweetwater Co., 11-16n-101w	65.0	60.7	2		25.5		36.8			26.3	
Emigrant Trail, Uinta Co., 1-16n-113w	60.0	44.4	7						82.7		
Manning, Converse Co., 15-39n-73w	3.0	0.7	3						1.8		
Patrick Draw, Sweetwater Co., 25-19n-99w	27.0	26.4	2		15.4	4.6	7.1			8.1	
Chevron USA Inc.—Carter Creek, Uinta Co., 6-18n-119w	150.0	124.0	3							133.0	
Cities Service Co.—Red Desert, Sweetwater, Co., 7-19n-96w	40.0	6.0	7						4.0		
Thundercreek, Campbell Co., 24-43n-69w	10.0	1.0	7						4.0		
Coastal Oil & Gas Corp.—Patrick Draw, Sweetwater Co., 12-19n-99	10.0	2.5	3		1.9		1.2			0.4	
Colorado Interstate Gas Co.—Rawlins, Carbon Co., sw4-sw4 25-21n-86w	220.0	206.0	2		61.0		46.6		25.0		
Farmland Industries Inc.—Gillette, Campbell Co., 1-49n-74w	7.0	2.5	3		2.5				5.5		
Inexco Oil Co.—Well Draw, Converse Co., ne se9-35n-70w	20.0	6.0	2		9.9					8.1	
KN Energy Inc.—Casper, Natrona Co., 10-33n-78w	80.0	43.2	1		13.0		4.2			3.1	
Flat Top, Converse Co., 20-33n-68w	5.0	1.6	1		2.4			2.7			
Marathon Oil Co.—Rock River, Carbon Co., 34-19n-78w	0.5	0.2	3						0.6		
MGPC—*Hilight, Campbell Co., 26-45n-71w	30.0	10.0	3		12.5		11.9			5.1	
Newcastle, Weston Co., 9-42n-64w	5.0	3.5	3		7.4			8.4			
Oedekoven, Campbell Co., 30-73w-55n	12.5	1.3	3		3.0		1.2			1.1	
Mitchell Energy & Development Corp.—Converse Co.	1.5	0.3	4						1.3		[11]<0.1

---

† Fractionation. (Figures in parenthesis do not represent primary production, and are not added in state totals) §Butane-gasoline mix

Company, plant, location	MMcfd			Production—1,000 gal/day (Average based on the past 12 months)							
	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
NGL Production Co.—Moxa Arch, Lincoln Co., 19-19n-112w	30.0	22.0	5	....	....	....	....	....	2.9	....	....
Northern Gas Products Co.—Painter, Uinta Co.	35.0	52.6	3	....	....	....	....	102.7	....	....	....
Northwest Pipeline Corp.—Opal, Lincoln Co., 27-21n-114w	250.0	162.0	2	....	79.4	....	47.1	....	277.0	32.1	....
Phillips Petroleum Co.—Douglas, Converse Co., se4-ne4 34-33n-71w	75.0	NR	7	....	....	....	....	....	....	....	....
Ralston Processing Associates Inc.—Oregon Basin, Park Co., nw4 8-52n-100w	6.0	3.8	2	....	4.2	2.0	2.0	....	....	3.9	....
Sun Exploration & Production Co.—Grieve, Natrona Co., 22-32n-85w	11.6	10.0	2	....	10.6		....	....	9.7	....	....
Union Oil Co.—Worland, Washakie Co., 17-48n-92w	50.0	13.7	1	....	13.5	....	3.7	....	7.9	....	....
Western Gas Processors—Hartzog Draw, Campbell Co., nw4 ne4 11-45n-76w 6th PM	6.0	2.4	3	....	....	....	....	....	19.0	....	[11]1.2
Wexpro Co.—Butcherknife Springs, Uinta Co., 35-15n-113w	12.5	2.7	1	....	....	....	....	....	....	....	[11]5.7
Church Buttes, Uinta Co., 1-16n-113w	100.0	22.5	1	....	....	....	....	....	3.0	....	....
Total	**1,815.2**	**1,169.7**		....	**322.6**	**6.6**	**213.9**	**113.8**	**688.5**	**271.8**	**184.4**
ABU DHABI											
Abu Dhabi Gas Liquefaction CL—Zakum, Umm Shaif, El Bunduq, Das Island	450.0	489.8	2-5-6	....	337.3	288.8	....	....	....	184.5	†3,699.0
Abu Dhabi National Oil Co.—											
Adgas, Adma offshore area	530.0	430.0	6&7	....	5.6	....	4.6	....	....	3.2	†42.4
Gasco, Adco onshore area	818.0	440.0	6	....	14.3	....	15.6	....	....	16.2	....
Habshan, Thamama F onshore area	250.0	37.0	5	....	....	....	....	....	....	....	[11]71.4
Habshan, Thamama C onshore area	450.0	155.0	6&7	....	....	....	....	....	....	....	[11]237.8
Total	**2,498.0**	**1,551.8**		....	**357.2**	**288.8**	**20.2**	....	....	**203.9**	**309.2**
† LNG.											
ALGERIA											
Sonatrach—Camel plant, Arzew	NR	170.0	4&7	....	....	....	....	218.6	....	....	....
Hassi R'Mel, Laghouat, Module 0	NR	1,578.0	NR	....	....	....	....	....	....	....	[11]2,309.0
Hassi R'Mel, Laghouat, Module 1	NR	2,085.2	6	....	....	....	....	....	....	....	[11]3,140.2
Skikda	NR	435.0	4&7	....	....	....	....	414.2	....	....	....
Total	**5,335.2**	**4,268.2**		....	....	....	....	**632.8**	....	....	**5,449.2**
ARGENTINA											
Cogasco SA—*Loma de la Lata, Neuquén	353.3	212.0	7	....	82.6	....	50.7	....	....	45.9	....
Gas del Estado—*Cañadón Alfa, Tierra del Fuego	NR	76.0	1	....	....	....	....	....	....	18.6	....
*Cañadón Piedras, Tierra del Fuego	NR	50.0	1	....	....	....	....	....	....	7.6	....
*Cañadón Seco, San Jorge, Santa Cruz	NR	11.0	2	....	5.0	....	5.8	....	....	5.3	....
*Caimancito Norte, Ledesma, Jujuy	....	....	2	....	5.0	....	10.2	....	....	2.6	....
*Centenario, Neuquen	NR	25.0	2	....	8.4	....	10.2	....	....	10.6	....
*El Medanito, La Pampa	NR	22.0	3	....	....	....	....	....	....	7.9	....
*Fernandez Oro, Rio Negro	NR	15.0	5	....	....	....	....	....	....	0.4	....
*General Cerri, Buenos Aires	636.0	600.0	7	545.0	312.1	....	201.8	....	....	82.0	....
*Loma de la Lata, Neuquen	353.0	318.0	7	....	83.2	....	60.3	....	....	58.1	....
Rio Neuquen, Neuquen	NR	100.0	5	....	....	....	....	....	....	36.9	....
Total	**1,715.9**	**1,429.0**		**545.0**	**496.3**	....	**339.0**	....	....	**275.9**	....
AUSTRALIA											
Esso Australia Ltd.—											
Gippsland No. 1, Longford, Victoria	370.0	170.0	2	138.0	164.0	....	89.0	....	....	....	[11]207.0
Gippsland No. 2, Longford, Victoria	367.0	170.0	7	138.0	164.0	....	89.0	....	....	....	[11]207.0
Gippsland No. 3, Longford, Victoria	370.0	170.0	7	138.0	164.0	....	89.0	....	....	....	[12]207.0
Santos Ltd.—Moomba	600.0	433.0	3	....	....	....	....	....	....	....	[11]126.0
Total	**1,707.0**	**943.0**		**414.0**	**492.0**	....	**267.0**	....	....	....	**747.0**
AUSTRIA											
OeMV AG—Piberbach, Upper Austria	2.2	1.6	3	....	....	....	....	....	0.3	....	....
Roseldorf, Lower Austria	3.5	3.1	....	....	....	....	....	....	....	....	....
Total	**5.7**	**4.7**		....	....	....	....	....	**0.3**	....	....
BAHRAIN											
Bahrain National Gas Co.—Jebel Ad-Dukhan	**145.0**	**110.0**	2	....	**115.5**	....	**96.6**	....	....	**142.8**	....
BANGLADESH											
Bangladesh Gas Fields CL—Titas, Brahmanbaria (6 plants)	340.0	40	1	....	....	....	....	....	....	1.3	[3]6.6 [11]8.2
Habiganj (2 plants)	120.0	40	1	....	....	....	....	....	....	....	[11]0.1
Total	**460.0**	**80.0**		....	....	....	....	....	....	**1.3**	**14.9**
BOLIVIA											
Yacimientos Petrolifros Fiscales Bolivanos—											
*Colpa plant, Andres Ibanez Province, Santa Cruz	192.0	110.0	1	....	....	....	....	....	10.0	....	....
*Rio Grande plant, Cordillera Province, Santa Cruz	282.0	270.0	1	....	....	....	....	....	22.6	....	....
Total	**474.0**	**380.0**		....	....	....	....	....	**32.6**	....	....
BRAZIL											
Petrobrás—Candeias, Bahia	81.8	70.6	2	....	....	....	....	....	126.6	....	....
Catu, Agua Grande, Bahia	57.5	49.4	2	....	....	....	....	....	122.9	....	....
Lagoa Parda, Espirito Santo	5.3	5.3	3	....	....	....	....	5.6	....	1.6	....
Reduc I, Rio de Janeiro	70.6	49.1	2	....	....	....	....	117.8	....	18.8	....

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Production—1,000 gal/day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Sergipe	96.8	70.6	2		....		....	154.0	....	51.0	....
Total	**312.0**	**245.0**		....	....	....	....	**277.4**	**249.5**	**71.4**	....

BRUNEI

Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Brunei Shell Petroleum CL—*Seria	48.0	40.0	1	....	12.5	....	....	....	37.1	....	....
Brunei LNG Sendirian Berhad—Darussalam	950.0	803.0	6						44.2	220.6	
Total	**998.0**	**843.0**		....	**12.5**	....	....	....	**81.3**	**220.6**	....

Canada

Alberta

Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Alberta Natural Gas CL—*Cochrane, ne¼ 16-26-4 5w5m	1,025.0	653.0	6-7	950.0					358.0		
Altana Exploration Co.—Caroline, 12-36-34-6-w5m	12.0	11.0	2						12.5		
Monitor, 10-3-35-4-w4m	10.0	9.0	4								
Niton, 10-16-55-13-w5m	5.0	2.0	3						0.6		
Saddle Lake, 16-26-57-13-w4m	3.5	2.8	4								
Altex Resources Ltd.—Delburne, LSD 10-8-37-23 w4m	13.0	3.8	4-5							0.8	
Penhold, LSD 10-30-36-27 w4m	6.5	2.4	3-4						1.7		
Amoco Canada Petroleum CL—											
Ante Creek, nw 18-65-23 w5m	10.0	6.2	2					18.8			
Ante Creek, LSD 13-65-24 w5m	2.0	1.8	2							0.2	
Ante Creek, LSD 10 4-66-23 w4m	10.0	2.7	3					2.1			
Berrymoor, 2-50-6 w5m	13.0	8.6	3						4.0		
Bigoray, 6-28-51-8 w5m	13.0	6.6	3							1.3	
Bigstone D-3, sw¼ 10-61-22 w5m	49.0	19.7	3								
Bigstone Dunvegan, se 10-61-22 w5m	18.0	9.1	3					13.4			
Buck Creek, nw 24-48-7 w5m			†		(186.9)		(125.3)			(93.2)	
Carrot Creek, 2 18-52-11 w5m	30.0	7.2	3					8.7			
East Crossfield D-1, n¼ 14-28-1 w5m	105.2	88.4	3							5.3	
Elkton, East Crossfield, ne¼ 14-28-1 w5m	34.9	22.4	3					2.7		6.9	
Fir, ne¼ 32-58-21 w5m	100.0	55.0	1								
Hyle, 12-65-15 w4m	3.0	1.2	3								
Josephine, ne¼ 1-83-10 w6m	50.0	9.6	3							4.5	
Kirby, nw 25-73-5 w4m	53.0	25.0	4								
Lobstick 1, sw¼ 17-50-7 w5m	20.0	11.6	3						12.4		
Lobstick 2, sw¼ 17-50-7 w5m	15.0	4.6	3						2.2		
Marten Hills, 18-76-25 w4m	142.0	35.4	5								
Mitsui, 30-72-4 w5m	25.0	6.2	3						46.5		
Nipisi, 4 11-80-8 w5m	25.0	19.6	3								
Pembalta 1, ne¼ 25-48-7 w5m	8.0	3.6	3						19.3		
Pembalta 2, e½ 15-47-7 w5m	16.0	11.3	3						31.1		
Pembalta 5, sw¼ 2-48-8 w5m	7.0	1.7	3						8.4		
Pembalta 7, sw¼ 34-47-9 w5m	14.0	6.8	3						26.1		
Pembalta 8, sw¼ 5-49-9 w5m	11.0	2.8	3						11.5		
*Ricinus, 11-30-35-8 w5m	115.0	85.0	3						192.4		
Sedalia, 5-26-30-4 w4m	8.5	4.2	3							0.8	
South Wapiti, ne 36-67 9 w6m	298.0	72.0	3							20.8	
St. Albert, 14 36-53-26 w4m	2.0	0.6	3					2.4			
Three Hills Creek, nw½ 13-35-26 w4m	12.0	5.3	3					7.4			
Tony Creek, 7 16-64-2.1 w5m	12.0	0.2	3							0.2	
Waskahigan, ne7-64-23 w5m	16.3	5.4	5							0.6	
*West Whitecourt, 8-17-60 15 w5m	421.6	177.0	2							77.5	
Worsley, 7-22-87-7 w6m	57.0	2.9	5							2.1	
Anderson Exploration Ltd.—Bruce, 10-1-48-15 w4m	3.0	2.0	4								
Buff Coulee, 11-12-47-7 w4m	6.6	5.5	4								
Hines, LSD 6-35-85-3 w6m	5.0	4.0	4-5								
Dixonville, 8-14-85-25 w4m	4.0	3.2	4								
Mirage, 10-2-79-8 w4m	1.5	1.0	3-4								[11]0.4
Woking, 11-30-75-4 w6m	5.0	5.0	3						0.5		
Andex Oil CI—Highvale, 10-4-51-4 w5m	8.5	4.0	3					2.5			[11]1.5
Bankeno Resources Ltd.—Knopcik, 9-10-74-11 w6m	15.0	12.5	3					9.5			
Bumper Development Corp. Ltd.—Bumper Crystal, LSD 16-36-45 w4m	4.0	0.8	3					0.1			
Canadian Hunter Exploration Ltd.—Basset Lake, ne¼ 29-104-2 w6m	7.0	6.0	4								
Basset Lake South, ne¼ 29-106-5 w6m	4.0	3.0	2								
Elmworth, se¼ 8-70-11 w6m	450.0	447.0	5								[11]76.0
Haig River, nw¼ 33-104-5 w6m	5.0	4.0	2								
Karr, nw¼ 10-65-2 w6m	43.0	41.0	3						89.0		
South Gold Creek, nw¼ 15-66-5 w6m	15.0	10.0	1								[11]9.8
Canadian Occidental Petroleum Ltd.—Eaglesham, 5-13-77-26 w5m	7.0	2.1	3							1.0	
Keystone, 5 35-46-4 w5m	10.0	4.0	2		2.5		2.5			2.5	
Paddle River, LSD 13, 6-57n-8 w5m	80.0	38.0	7						57.4	2.5	
Petrogas Processing, Crossfield, s½ 2-26-29 w4m	210.0	100.0	2-4		26.9		20.0			36.7	
Canadian Superior Oil Ltd.—*Harmattan, 27-31-4 w5m	504.0	273.8	2		117.3		85.8			214.8	
Lone Pine Creek South, 27-29-28 w4m	35.0	11.7	3							5.4	
Canterra Energy Ltd.—											
Cessford, Special Area 3, LSD 4-6-24-10 w4m	12.0	7.3	1								[11]<0.1
Consort, Special Area 4, LSD 7-34-34-6 w4m	5.0	2.0	1								[11]0.2
Flat Lake, 13-12-66-20 w4m	25.0	9.9	4								
Ghost Pine, 10-4-32-23 w4m	3.0	1.9	3						0.8		[11]0.6
Jarvie, 15-5-62 I w5m	12.0	6.0	1								[11]0.4
Nordegg River, w½ 10-44-12 w5m	66.7	24.7	1								[11]10.7
Okotoks, MD 31, Foothills, sw¼ 27-20-29 w4m	34.8	26.9	1								[11]3.5
Rainbow, 10-10-109-8 w6m	90.0	80.0	1-2-4						750.0		[11]27.0
Ram River, 2-37-10 w5m	630.0	360.0	1							28.0	
Verger B, 7-26-22-16 w4m	4.0	3.5	3							1.0	

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Production—1,000 gal/day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Veteran, Special Area 4, LSD 15-20-34-8 w4m	5.0	3.0	3								[11]0.9
Wimborne, 16-5-35-26 w4m	4.3	1.8	3-4								[11]<0.1
Chevron Canada Resources Ltd —											
Bigoray, 10-7-51-9 w5m	3.0	2.7	3-4					15.8			
Brazeau, 16-35-48-12 w5m	10.0	10.5	3-4					25.6			
Ferrybank, 14-11-45-27 w4m	5.2	4.6	3-4					3.0		0.2	
Joffre, 14-36-38-27 w4m	9.0	2.6	3-4					3.1			
*Kaybob South No. 3, 15-59-18 w5m	445.0	374.0	2&4					321.4		320.2	
Mitsue, 11 30-72-4 w5m	30.0	16.2	2&4		57.0		36.6			20.8	
North Gilby, 1-24-41-3 w5m	23.0	7.3	3&5						9.1		
Princess, 12-12-20-12 w4m	13.0	3.5	5							0.6	
Sylvan Lake, 1-21-38-2 w5m	31.5	15.1	2		12.7		8.7			7.1	
*West Pembina, 11-22-49-12 w5m	29.7	26.7	3-4					28.9		88.2	
Coenerco—Blackie, 06-15-20-27 w4m	4.0	1.5	3-4						4.5		
Carrot Creek, LSD 10-16-53-13 w5m	6.0	4.0	2-3						8.0		[11]0.4
Cessford, LSD 7 5-26-12 w4m	1.0	0.6	3-4								
Edson 1-13, LSD 1-13-54-19 w5m	10.0	9.0	3-4						12.0		
Edson North, LSD 16-15-53-18 w5m	8.0	4.0	3-4						4.0		
Edson South, 10-30-52-17 w5m	1.5	1.2	3-4						3.0		
Medicine River, LSD 10-14-39-3 w5m	6.0	4.0	3-4						7.5		
Dome Petroleum Ltd.—Amisk, 1-23-41-8-w4m	10.3	3.4	3-4-5							0.1	
Athabasca East, 9-23-66-22 w4m	9.0	3.2	4								
Athabaska North, 5-18-67-22 w4m	6.0	2.2	4								
Atlee-Buffalo, 12-21-20-8 w4m	4.0	1.0	4								
Arrowwood North, 4-15-21-25 w4m	7.9	4.0	4								
Arrowwood South, Hussar, 1-7-20-25 w4m	24.9	5.2	4								
Bolloque, 16-23-64-26 w4m	10.0	2.7	4								
Bouvier, 15-29-70-24 w4m	5.2	0.7	4								
Braeburn, 16-19-77-10 w6m	5.6	0.1	4								
Brazeau River, 1-46-14 w5m	218.0	79.0	1-3-4					33.3			
Brownfield, se¼-2-39-12 w4m	19.9	14.6	4-5							1.6	
Caroline North, 1-11-35-6 w5m	52.2	27.5	3-4						30.2	25.1	
Caroline South, 3-20-34-4 w5m	53.6	29.7	3&5		18.1		17.6			27.8	
*Castor East, 4-3-38-13 w4m	19.9	7.3	4-5							0.7	
Cessford, 2-8-24-12 w4m	125.0	26.6	3-4							3.1	
Cherhill, 4-24-56-5 w5m	4.5	2.8	3						1.9		
Chinchaga, 1-24-96-5 w6m	89.0	46.2	3-4						46.8	73.0	
Cho~~ice, 13-17~~-40-9 w4m	9.9	1.7	4-5							0.1	
Craigend, 16-1-64-13 w4m	5.0	1.5	4								
Consort, 8-19-36-5 w4m	70.6	21.6	4							8.0	
Cutbank, 7-16-62-8 w6m	70.0	15.8	3-4						6.6		
Duvernay, 11-11-55-12 w4m	14.6	2.0	4								
Edmonton Ethane, sw¼-4-52-25 w4m	315.0	207.1	7	344.8					283.3		
Edwand, 7-12-62-17 w4m	2.5	0.5	4								
Edson, 3&4 11-53-18 w5m	372.0	124.7	1-3-4							38.0	
Elk River, 4-6-47-12 w5m	7.0	1.8	3							0.6	
Empress Ethane 1, sw¼ 12-20-1 w4m	1,500.0	1,304.0	7	716.8					541.1		
Empress Ethane 2, sw¼ 12-20-1 w4m	2,000.0	592.0	7	451.9					292.7		
Enchant, 11-9-14-16 w4m	7.0	4.0	4								
Flat Lake, 11-17-67-18 w4m	6.5	0.6	4								
Garrington, 11-17-34-3 w5m	19.9	7.9	3-4 5&7					22.1	2.5		
Gilby North, 9-12-41-4 w5m	4.6	1.6	3-4							0.7	
Gilby South, 8-26-40-3 w5m	9.0	3.3	5							1.6	
Goodfare, sw 19-72-11 w6m	69.5	43.4	3						12.7		
Haight Mundare, 6-8-53-16 w4m	7.0	2.6	4								
Hilda, 16-22-17-2 w4m	6.0	2.0	4								
Hollow, 10-22-61-20 w4m	10.0	2.3	4								
Hotchkiss MD, 11-29-94-25 w5m	191.1	9.6	4								
Hotchkiss North, 2-35-94-2 w6m	20.6	8.9	4								
Hotchkiss South, 9-34-93-01 w6m	22.1	5.0	4								
Inland, 4-25-51-15 w4m	7.4	1.6	3-4							<0.1	
Inland South, 15-31-50-14 w4m	9.0	3.9	4								
Jenner, 10-34-19-9 w4m	13.9	4.9	4								
Jenner-Musketeer, 10-34-19-09 w4m	13.9	3.7	4								
*Kaybob South 1, 1-12-62-20 w5m	226.0	122.4	1-3-4		77.7		59.7			120.6	
*Kaybob South 2, 3&4 12-62-20 w5m	170.0	108.7	1-3-4						125.8	143.6	
Keystone, 6-15-48-3 w5m	7.4	3.9	3-4						5.3		
Kirby Lake, 12-8-74-5 w5m	44.8	13.5	4								
Lavoy, 11-12-52-14 w4m	15.9	13.2	4								
Lone Pine Creek, 6-23-30-28 w4m	74.0	22.4	3-4							19.6	
Mannville, 3-27-50-9 w4m	33.9	6.5	4								
Medicine Hat, 2-27-15-4 w4m	12.0	10.4	4								
Medicine Hat North, 1-7-16-2 w4m	4.5	3.0	1&4								
Medicine River, 6-16-38-4 w5m	8.0	3.7	3						2.9		
Meanook, 6-10-63-22 w4m	5.2	4.0	4								
Monitor, 2-3-35-5 w4m	6.5	0.8	1&4								
Patricia, 13-5-21-12 w4m	7.9	3.1	4								
Prosperity, 11-28-67-19 w4m	6.0	4.5	1&4								
Provost, ne¼-19-36-5 w4m	80.0	50.0	5							3.3	
Provost East, 3-30-37-2 w4m	9.5	5.2	4-5							0.7	
Ranfurly, 14-32-50 12 w4m	15.9	3.4	4								
Steele, 10-19-77-24 w4m	9.0	2.2	5								
Sturgeon Lake South, se 2-69-22 w5m	20.0	13.0	3-4						26.1		
Sundance, 6-25-54-21 w5m	15.5	14.9	3-4							10.5	
Sylvan Lake, 10-12-38-3 w5m	4.0	1.9	4						1.6		
Sylvan Lake, 14-32-37-3 w5m	64.7	24.5	3		19.9		10.3			9.3	
Tangent, 16-20-80-24 w5m	7.5	1.1	3								
Tower North, 6-14-76-16 w4m	7.0	7.3	4								
Travers, 16-13-14-18 w4m	15.0	6.7	3-4							0.1	
Twining, sw 31-32-24 w4m	8.3	6.0	3-4							5.0	
Valhalla, 1-29-75-9 w6m	31.4	14.5	3							2.1	
Verger, 6-25-23-16 w4m	2.0	0.1	3								
Vulcan, se¼-24-15-22 w4m	55.2	39.6	3-4						7.0		
Wandering River, 9-30-72-14 w4m	11.9	1.9	4								
Warwick, 10-18-53-14 w4m	8.4	2.6	4								
West Fox Creek, 13-22-60-19 w5m	15.7	4.5	3-4								
West Paddle River, 11-10-56-11 w5m	17.7	7.8	3					6.2		1.4	
Whitelaw, 13-20-81-1 w6m	10.0	2.1	4								
Wildunn, 7-9-12 w4m	10.0	4.6	3							0.3	
*Willesden Green, 27-42-8 w5m	40.0	27.0	3-7						30.4		

	MMcfd			Production—1,000 gal/day (Average based on the past 12 months)							
Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Zama, nw 12-116-6 w6m	25.2	9.7	3						13.4	4.7	
Esso Resources Canada Ltd.—Boundary Lake South, Floral, 1-14-85-13 w6m	17.0	3.1	4							0.8	
Comet Galaxy, Rainbow Lake, 12-23-110-7 w6m	8.0	5.8	3								
*Devon—1 and 2, 34-50-26 w4m			†		(138.7)		(89.8)			(69.4)	
Euerdell, Ferrier 14-20-38-7 w5m	10.0	3.8	3-4		3.5		2.2			1.1	
Golden Spike, 16-22-51-27 w4m	126.0	126.0	4		20.3		13.6			10.1	
Joffre D2, Lacombe, ne¼ 17-39-26 w4m	7.5	3.0	3-4		2.8		1.7			0.5	
Judy Creek, 10-25-64-11 w5m	265.0	153.6	1-2-3 4-5&7						723.4		
Leduc, Devon, 34-50-26 w4m	35.0	29.2	3		17.2		18.2			9.1	
Niton, LSD 14-18-54-12 w5m	50.0	30.7	3		3.8		3.8			5.1	
Quirk Creek, s½ 4-21-4 w5m	90.0	33.3	2		14.4		10.7			13.8	
Redwater, LSD 8 29-57-21 w4m	22.1	10.2	2		23.0		18.1			11.1	
General American Oils Ltd.—Gilby, LSD 6-36-40-3 w5m	2.7	2.4	3-4							1.5	
Sylvan Lake, LSD 13-25-37-3 w5m	30.0	22.0	3						30.6		
Goliad Resources Ltd.—Bantry, LSD sw¼ 33-48-7 w5m	3.0	2.0	3						2.5		
Gulf Canada Resources Inc.—											
Baptiste, LSD 5-28-67-22 w4m	10.4	5.0	4								
Blood Magrath, 7-8-6-22 w4m	11.5	3.5	3					0.4			
Buffalo Lake North, LSD 11-24-41-21 w4m	7.1	4.0	3								[11]0.4
Hanna, LSD 2-36-31-14 w4m	3.0	1.5	3-4								[11]0.3
Hanlon Robb, ne¼ 2-49-20 w5m	300.0	75.8	3					1.8			
Morrin-Ghost Pine, LSD 1, 8-11-31-21 w4m	109.5	47.6	3					29.3		0.9	
Nevis, ne¼ 9-33-38-22 w4m	125.0	75.7	2		102.7		64.4			47.0	
North Sibbald, LSD 6-9-31-1 w4m	2.6	1.8	4								
Rimbey, LSD s½ 5-44-1 w5m	421.0	241.0	2		268.8		146.8			197.4	
Starrs Gilby, 6-13-40-3 w5m	24.9	14.9	1							6.1	
Strachan, LSD 11-35-37-9 w5m	275.0	135.0	7					78.3		116.4	
Swalwell, LSD 6-33-29-24 w5m	4.0	1.1	6					0.7			
Home Oil CL—Bashaw, 8-10-42-22 w4m	11.9	4.8	5								[11]<0.1
Carstairs-Crossfield, 3-3-30-2 w5m	280.0	88.0	2		50.4		38.1			65.5	
Cossack, 7-17-60-17 w4m	6.0	0.8	4								
Leismer, 6, 7-77-7 w4m	35.0	26.6	4								
Marten Hills South-1, 14-22-74-24 w4m	21.0	11.7	4								
Marten Hills South-2, 14-29-74-25 w4m	8.0	0.6	4								
Retlaw, 12-2-13-19 w4m	10.0	4.4	5							0.2	
South Elkton, 2-3-31-4 w5m	4.4	0.1	2							0.7	
Tieland, 5-14-67-2 w5m	10.0	5.4	4								
ICG Resources Ltd.—											
Acheson, sw¼ 2-53-26 w4m	10.0	8.0	2		28.0		14.0			9.8	
Gilby, 10-10-041-03-w5m	12.0	4.0	5						1.7		
Hilda, 4-26-17 2 w4m	5.5	2.0	4								
Leafland, 13-16-040-05 w4m	5.5	2.7	7					3.5			
Many Islands, 4-16-14-1 w4m	28.0	15.0	4								
Medicine Hat South, 16-7-11-4 w4m	6.0	2.5	4								
Tweedie, se½ 19-68-12 w4m	15.5	11.0	4								
Willesden Green, 13-16-40 5 w5m	5.0	3.0	7					4.3		0.1	
Kerr-McGee Corp.—Elnora, 5-19-35-22 w4m	18.1	6.0	2								[11]3.7
Ferrybank, 3-31-44-27 w4m	8.5	2.6	2								[11]0.1
Huxley, 10 8-35-24 w4m	1.1	0.4	4								
Prevo, 10 2-39-1 w5m	1.0	0.2	4								[11]<0.1
Rich, County 6 16-22-35-21 w4m	3.0	0.8	2								[11]<0.1
Lariat Oil & Gas Ltd.—Three Hills, LSD 11-16-31-23 w4m	5.0	2.0	2						0.8		
Merland Explorations Ltd.—											
Bantry, 5-8-19-13 w4m	16.0	10.0	4								
Bellshill Lake, 7-21-42-12 w4m	2.5	1.5	4-5								[11]0.2
Birchway, 4-27-44-10 w4m	3.5	2.0	4								
Canard, 9-30-57-8 w4m	9.0	9.0	4								
Conlac, 14-14-14-3 w4m	25.0	20.0	4								
Fenn Big Valley, 8-27-35-19 w4m	6.0	6.0	3-4					4.6			
Garden-Plains, 5-15-33-13 w4m	10.0	10.0	4-5								[11]1.3
Giroux Lake, 10-11-66-22 w5m	2.0	0.5	3-4								[11]0.4
Halkirk, 14-11-39-16 w4m	2.0	1.0	3-4								[11]<0.1
Hilda, 9-34-18-2 w4m	6.0	3.5	4								
Jarrow, 8-15-45-11 w4m	15.0	10.0	4								
North Beaverhill Lake, 4-17-52-18 w4m	4.0	3.5	3-4								[11]<0.1
North Mannville, 13-16-53-10 w4m	8.0	8.0	4								
North Plain Lake, 13-31-54-11 w4m	4.0	3.0	4								
Ukalta, 10-1-57-18 w4m	5.0	4.0	4								
Vale, 15-19-14-3 w4m	30.0	25.0	4								
Viking-Kinsella, 11-17-46-8 w4m	15.0	12.0	4								
Warwick, 8-34-52-14 w4m	4.0	3.0	4								
Westlock, 13-24-61-26 w4m	10.0	7.5	2&4								[11]2.0
Willingdon, 11-20-55-15 w4m	18.0	15.0	4								
Mobil-GC Canada Ltd.—Teepee Creek, Grande Prairie, LSD 7-2-74-4 w6m	18.5	13.0	3						0.6		
Mobil Oil Canada Ltd.—*Carson Creek, 4 23-61-12 w5m	70.0	64.5	2&4		79.7		52.8			51.7	
Duhamel, 3 32-46-21 w4m	3.7	1.4	3-4					3.2	1.9		
Pembalta IV, 16 16-49-8 w5m	11.0	6.0	3-4						5.0		
Three Hills, 4 33-31-23 w4m	30.0	12.0	3-4					10.2			
Willisden Green, 8 29-40-6-5 w5m	0.9	0.5	3-4						0.5		
Wimborne, 4 12-34-26 w4m	30.0	11.0	3-4								
Wintering Hills, 16 7-24-16 w4m	6.0	2.5	3-4						0.1		
Murphy Oil CL—Gage Cessford, 11-27-25-13 w4m	4.0	1.1	4								
Princess No. 1, 14-23-19 w4m	8.0	3.0	4								
Princess No. 2, 10-9-20-10 w4m	8.0	<0.1	4								
Sugden, 3-16-61-8 w4m	11.5	3.7	4								
Winnifred 1, Bow Island, 3-17-11-10 w4m	3.0	0.1	4								
Norcen Energy Resources Ltd.—Bigoray, Parkland 31, 10-22-51-8 w5m	3.0	0.7	4							0.4	
Bruce, Beaver 9, 3-06-47-15 w4m	30.0	5.5	1&4							0.1	
Ferrier Radial Lake, se¼ 34-40-9 w5m	20.5	6.1	2	<0.1	4.4		2.6			6.7	
Cilby, Lacombe, 10-8-41-1 w5m	3.5	0.4	2&4					0.4			
Joarcam, 25 Leduc, 7-14-50-22 w4m	2.8	2.0	3-4						0.6		
Kessler, 13-5-39-8 w4m	6.0	2.3	4					0.3			

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Production—1,000 gal/day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
McLeod River, Dist. 14, 7-34-54-14 w5m	5.2	2.4	2	....	....	....	....	2.0	....	....	....
Netook-Olds, Mountain View 17, 16-21-33-1 w5m	2.0	1.4	1&4	....	....	....	....	....	....	0.6	....
Provost-Bodo, Provost 52, ne¼ 31-37-2 w4m	6.7	0.1	4	....	....	....	....	....	....	0.1	....
St. Albert, Sturgeon Dist., se¼ 26-54-25 w4m	20.0	16.7	2	....	6.0	....	4.0	....	....	4.2	....
NSM Resources Ltd.—Choice, 5 27-40-10 w4m	5.0	3.0	6	....	....	....	....	....	....	....	[11]0.2
Oakwood Petroleums Ltd.—Atim, 10-19-54-26 w4m	3.0	1.5	3-4	....	....	....	....	....	....	....	[11]0.4
Simonette, LSD 9-6-63-25 w5m	8.0	3.0	4-5	....	....	....	....	....	....	....	[11]0.4
Sylvan Lake, Viking A, LSD 10 3-38-2 w5m	2.0	1.2	3-4	....	....	....	....	....	....	....	[11]0.6
Paloma Petroleum Ltd.—Hotchkiss, LSD 7 13-94-3 w6m	5.0	3.6	4	....	....	....	....	....	....	....	....
Kinsella, LSD 12 36-49-13 w4m	5.0	3.3	4	....	....	....	....	....	....	....	....
Smoky River, 7 9-54-17 w4m	2.4	1.7	4	....	....	....	....	....	....	....	....
PanCanadian Petroleum Ltd.—Alderson West, 10-28-15-15 w4m	10.0	3.3	3	....	....	....	....	....	....	....	[11]1.1
Alderson West, 6-2-16-15 w4m	3.0	3.0	1	....	....	....	....	....	....	....	....
Bassano Lathom, 10-5-22-18 w4m	25.0	6.8	5	....	....	....	....	....	....	....	[11]0.8
Carseland, 16-21-22-25 w4m	12.0	7.6	3	....	....	....	....	....	....	....	[11]0.1
Countess 10-20-18-15 w4m	6.1	2.0	2	....	....	....	....	4.9	....	....	[11]1.4
Countess Makepeace, 12-33-22-18 w4m	50.0	11.6	3	....	....	....	....	....	....	....	[11]1.2
Entice, 10-7-28-23 w4m	7.0	1.8	3	....	....	....	....	....	....	....	[11]<0.1
Ferrybank, 2-1-44-28 w4m	26.0	5.3	3	....	....	....	....	....	....	....	[11]2.2
Gilby Cantex Nortun, 6-21-40-2 w5m	2.1	0.6	3	....	....	....	....	....	....	....	[11]0.2
Hussar Crowfoot, 14-1-24-22 w4m	28.0	8.9	3	....	....	....	....	2.7	....	....	[11]2.6
Long Coulee, 6-30-15-21 w4m	8.2	2.3	2	....	....	....	....	....	....	....	[11]0.7
Morley, 15-2-26-7 w5m	10.0	5.9	2	....	....	....	....	....	....	....	....
Rainier, 16-35-16-16 w4m	2.0	0.3	3	....	....	....	....	....	....	....	....
Redland, 1-20-28-21 w4m	20.0	13.7	3	....	1.1	....	1.5	....	....	....	[11]2.9
Wayne Dalum, 5-17-27-19 w4m	19.0	4.1	5	....	....	....	....	....	....	....	[11]0.6
Wintering Hills, 1-18-25-17 w4m	20.0	3.9	5	....	....	....	....	....	....	....	[11]0.8
Petro-Canada Inc.—Belishill, 3 28-41-12 w4m	3.0	1.8	3	....	....	....	....	....	4.5	....	....
*Brazeau, sw¼ 31-48-12 w5m	18.0	17.2	3	....	....	....	....	....	41.6	....	....
Connorsville, 9 32-25-15 w4m	29.8	12.5	3	....	....	....	....	....	....	2.6	....
Empress, ne¼ 11-20-1 w4m	2,000.0	1,567.0	7	1,018.3	458.0	80.1	100.7	....	....	75.2	....
Ferrier, 9 22-39-8 w5m	8.0	4.8	3	....	....	....	....	....	....	2.7	....
Gilby No. 1064, Fina, 7 27-40-3 w5m	4.2	1.2	6	....	....	....	....	....	....	0.2	....
Gilby No. 1130, 2 27-40-3 w5m	25.0	8.3	3	....	....	....	....	....	3.9	....	....
Gilby No. 1156, Medicine River, 5-40-3 w5m	28.0	18.2	3	....	....	....	....	....	14.8	7.6	....
Gold Creek, nw¼ 13 26-67-5 w6m	48.0	11.7	3	....	....	....	....	....	....	25.6	....
Greencourt, se¼ 9 26-59-9 w5m	37.2	12.6	5	....	....	....	....	....	....	2.0	....
*Kaybob, 8 9-64-19 w5m	126.3	45.8	3	....	....	....	....	....	84.8	14.7	....
Rainbow, 15 7-108-6 w6m	14.3	6.7	3	....	....	....	....	....	....	0.3	....
Sedgewick, 2 16-42-12 w4m	6.0	1.7	4	....	....	....	....	....	....	....	....
Whitecourt, Lac St. Anne, 12 26-59-11 w5m	65.0	31.3	5	....	....	....	....	....	....	5.6	....
Wildcat Hills, sw¼ 6 16-26-5 w5m	125.0	37.4	5	....	....	....	....	....	....	[1]0.3	....
Placer Cego Petroleum Ltd.—Provost, 4-16-033-7 w4m	5.5	2.2	2	....	....	....	....	....	....	....	[11]0.1
Sedalia, 9-29-31-05 w4m	8.0	6.9	5	....	....	....	....	....	....	....	[11]0.1
Steveville, 2-31-22-11 w4m	22.0	3.0	5	....	....	....	....	....	....	....	[11]0.2
Wood River, 16-08-43 2 w4m	5.0	1.0	5	....	....	....	....	....	....	....	[11]0.2
Saratoga Processing CL—Coleman, 11-8-5 w5m	35.0	22.1	1	....	....	....	....	....	....	....	....
Sceptre Resources Ltd.—											
Cessford, 7-17-26-14 w4m	4.0	1.8	3	....	....	....	....	....	....	....	[11]0.3
Holmberg, nw¼ 13 14-44-17 w4m	12.5	9.2	3	....	....	....	....	....	....	....	[11]0.2
Huxley, 6-17-34-24 w4m	12.5	3.2	5	....	....	....	....	....	....	....	[11]0.4
Judy Creek, 1-21-63-11 w5m	3.0	0.5	4	....	....	....	....	....	....	....	<[11]0.1
Stanmore, 5-1-29-12 w4m	30.0	11.3	3	....	....	....	....	....	....	....	[11]11.6
Shell Canada Resources Ltd.—Burnt Timber 1 and 2, 13-30-7 w5m	106.0	71.0	1-2	....	....	....	....	....	....	11.3	....
Cranberry Lower Debolt, 4-20-96-3 w6m	14.0	10.0	4	....	....	....	....	....	....	....	....
Cranberry Slave Point, 4-20-96-3 w6m	17.0	3.0	3-4	....	....	....	....	....	....	5.3	....
Gordondale, 24-79-11 w5m	14.0	4.0	6	....	....	....	....	....	....	1.3	....
Hope Creek, 17-64-13 w5m	10.0	2.0	1&3	....	....	....	....	....	....	2.5	....
House Mountain, 8-70-10 w5m	4.0	1.0	3	....	....	....	....	....	13.5	....	....
Innisfail, 3-35-1 w5m	13.0	8.0	1&3	....	....	....	....	....	....	9.0	....
*Jumping Pound, nw¼ 13-25-5 w5m, se¼ 23-25-5 w5m, sw¼ 24-25-5 w5m	185.0	155.0	1-2-3	....	21.0	....	27.0	....	....	93.0	....
Pouce Coupe, 8-80-12 w6m	3.0	1.0	1&6	....	....	....	....	....	....	0.5	....
Simonette, 6-63-25 w5m	27.0	4.0	1&3	....	....	....	....	23.0	....	....	....
South Rosevear, ne 11-54-15 w5m	50.0	25.0	2	....	....	....	....	....	....	8.0	....
*Waterton 1-2 and Straddle s½ 20-4-30 w4m, n½ 17-4-30 w4m, se¼ 24-4-1-w5m	302.0	152.0	1-2-3	161.0	74.0	....	64.0	....	....	248.0	....
Star Oil & Gas Ltd.—Opal, Redwater, 8-25-57-23 w4m	6.2	3.0	2&4	....	....	....	....	....	....	....	....
Grassland, 6-13-68-18 w4m	2.0	1.0	4	....	....	....	....	....	....	....	....
Sunnybrook, Bell River Pool 15-22-48-2 w5m	5.0	3.0	2&4	....	....	....	....	....	0.5	....	....
Sylvan Lake, Basal Quartz, Glauc., 16-19-38-1 w5m	7.0	6.0	2&4	....	....	....	....	....	4.0	....	....
Steen Resources Ltd.—Crossfield, 8-20-30-3 w5m	4.0	3.0	4	....	....	....	....	....	....	....	[11]4.2
Sulpetro Ltd.—Castor, 4-3-38-13 w4m	1.5	0.7	6	....	....	....	....	....	3.8	....	....
Minnehik-Buck Lake, 10-5-46-6 w5m	102.0	25.5	5	....	....	....	....	....	....	14.8	....
Wapiti, 4-8-69-8 w6m	125.0	53.2	3	....	....	....	....	....	....	7.1	....
Suncor Inc.—Calling Lake South, 1-20-70-20 w4m	12.0	3.5	1	....	....	....	....	....	....	....	....
Countess-Duchess, Newell Co., LSD 08-36-20-16 w4m	21.0	7.9	4-5	....	....	....	....	0.3	....	....	....
Enchant, Taber Co., LSD 11-35-13-17 w4m	20.0	8.9	4-5	....	....	....	....	0.3	....	....	....
Joffre, LSD 13-12-38-12 w4m	6.4	3.1	3	....	....	....	....	....	2.9	....	....
Killam, Flagstaff 29, LSD 12-23-42-11 w4m	20.0	1.7	4-5	....	....	....	....	0.1	....	....	....
Northwest Jenner, Imperial Dist., LSD 9-21-21-9 w4m	7.0	0.5	4-5	....	....	....	....	....	....	....	....
Rosevear, ne¼ 16-33-54-15 w5m	30.0	12.7	6	....	....	....	....	....	....	....	[11]3.8
Sibbald, LSD 5-6-28-2 w4m	7.5	1.8	4-5	....	....	....	....	0.1	....	....	....
Texaco-Canada Resources Inc.§—Battle Lake, 3-23-46-2 w5m	5.5	NR	3	....	....	....	....	....	5.8	....	....

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Production—1,000 gal/day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
*Bonnie Glen Cycle, 17-47-27 w4m	140.0	NR	7		176.6	31.7	69.5			180.6	
Bonnie Glen Gas No. 1, 17-47-27 w4m	50.0	NR	2		95.4		74.4			35.5	
Bonnie Glen Gas No. 2, 17-47-27 w4m	50.0	NR	3	171.9	162.2	30.1	65.5			38.8	
Cynthia, 13 22-49-10 w5m	8.0	NR	3					13.8		5.3	
Gilby, 15-22-40-3 w5m	58.0	NR	3		32.1		25.2			36.2	
Open Creek 10-34-42-5 w5m	8.0	NR	3						10.8		
Willesden Green, 17-42-6 w5m	12.2	NR	3					14.0		5.0	
Texas Pacific Oil Canada Ltd.—Ferrier Cardium 2, LSD 1-20-39-7 w5m	23.0	18.6	3						19.5		
Total Petroleum Canada Ltd.—Gilby, 10 12-41-3 w5m	8.0	3.2	1-4-5								[11]0.9
Sutton 7 21-90-4 w6m	3.0	2.0	1-4								
Ulster Petroleums Ltd.—Irvine, 1-23-12-2 w4m	8.0	5.0	4								
Western Decalta Petroleum Ltd.—*Breton, LSD 9-36-47-4 w5m	3.5	1.0	3					2.0			
Compeer, 6-36-33 2 w4m	5.0	2.0	1								
Hotchkiss, North, LSD 3 35-94-2 w6m	16.0	6.7	1								
Hotchkiss North 2, 7-31-93 1 w6m	2.5	0.4	1								
Rockyford, 10-24-26-23 w4m	5.0	1.6	3		0.8		0.3	0.7			
Turner Valley, LSD 11 14-6-20-3 w5m	100.0	22.4	2		24.0		16.8			13.9	
Woodland Oil & Gas Ltd.—Alix, 6-24-40-24 w4m	2.5	0.3	6		<0.1	<0.1	<0.1			0.1	
Boyer, 11-5-105-24 w5m	6.0	4.0	4								
Total	**19,856.9**	**10,989.0**		**3,814.7**	**2,002.3**	**141.9**	**1,077.1**	**727.9**	**4,080.9**	**2,775.6**	**178.0**

---

†Fractionation. (Figures in parenthesis do not represent primary production, and are not added in state totals). §All figures are capacity.

British Columbia

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Dome Petroleum Ltd.—Buick Creek North, 6-31 e-94 A-14	7.1	2.4	4								
Dahl, a-89 H-94 H-7	7.0	1.0	4								
Laprise, a-40 e-94 H-5	31.8	13.5	4								
Velma, a-89 D-94 H-8	12.1	0.3	4								
Esso Resources Canada Ltd.—Boundary Lake, 1-2-85-14 w6	17.5	8.1	2		13.7		9.0			3.9	
Mobil Oil Canada Ltd.—Sierra, c-91d-94I-14	310.0	143.0	5								
Petro-Canada Explorations Inc.—Taylor, 3-25& 26-82-18 w6m Plan 7891, Peace River	397.0	315.0		0.6	28.9	14.3	33.1			88.3	
Westcoast Transmission CL—Boundary Lake, A-10-25 15 w6m	8.9	1.2	1&7								
Fort Nelson, Lot 2683, Peace River	840.0	312.2	1								
Pine River, Lot 1156, Peace River	160.0	37.9	1								
Total	**1,791.4**	**834.6**		**0.6**	**42.6**	**14.3**	**42.1**	....	....	**92.2**	....

Northwest Territories

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Amoco Canada Petroleum Cl—Pointed Mountain, 95-85-n24	188.0	10.8	1								
Esso Resources Canada Ltd.—Norman Wells	8.0	1.1	5								
Total	**196.0**	**11.9**		....	....	....	....	....	....	....	....

Saskatchewan

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Dome Petroleum Ltd.— Steelman, w½-21-4-5 w2m	15.0	14.3	7	39.2					80.9		
Esso Resources Canada Ltd.— Smiley, 8-9-31-25 w3m	3.0	0.4	3						0.5		
ICG Resources Ltd.— Hatton, 4-15-14-27 w3m	9.0	8.0	3-4								
Totnes, 15-33-027-18 w3m	2.5	1.5	4								
Merland Explorations Ltd.— Horsham, 1-18-16-29 w3m	6.0	6.0	4								
McLaren Lake, 14-35-15-29 w3m	1.0	1.0	4								
Sand Hills, 4-35-13-25 w3	7.0	7.0	4								
Murphy Oil CL— North Dodsland, 8 13-32-21 w3m	5.0	1.0	3-4						0.2		
Saskatchewan Power Corp.— Coleville, 17-31-23 w3m	38.4	27.0	2								[11]22.4
Hoosier, 16-30-28 w3m	3.0	0.7	5								[11]<0.1
Success, 17-16-17 w3m	50.0	6.6	5								[11]<0.1
Star Oil & Gas Ltd.—Hatton 3, LSD 4 15-14-27 w3m	8.0	6.0	4								
Hatton East, 16-19-145-26 w3m	9.6	6.0	4								
Total	**157.5**	**85.5**		**39.2**	....	....	....	....	**81.6**	....	**22.4**

CHILE

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Empresa Nacional del Petroleo—*Cullen, Magallanes, XII Región	150.0	120.0	2		68.0		45.0		28.0		
Posesión-*Cabo Negro, Magallanes, XII Región	320.0	310.0	7		141.0		87.0			83.0	
Total	**470.0**	**430.0**		....	**209.0**	....	**132.0**	....	**28.0**	**83.0**	....

CHINA, TAIWAN

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Chinese Petroleum Corp.—Chingtsaohu plant and field, Hsin Chu area	60.0	4.5	7						3.1		
Chinshui plant, field, and area	36.0	19.4	2		8.3		5.9			3.2	
Chuhuangkeng plant, field, and area	75.0	38.3	1								
Tung Hsiao plant, Tieh-Che-Shan field, Tung Hsiao area	100.0	65.3	7	42.3	32.4	1.3	18.2			17.8	
Total	**271.0**	**127.5**		**42.3**	**40.7**	**1.3**	**24.1**	....	**3.1**	**21.0**	....

COLOMBIA

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Empresa Colombiana de Petroleos—CIB, Barranca, Santander	100.0	100.0	7	145.0	17.0						
GLP, El Centro, Santander	25.0	25.0	2		12.0		7.0			6.0	
Total	**125.0**	**125.0**		**145.0**	**29.0**	....	**7.0**	....	....	**6.0**	....

Company, plant, location	MMcfd Gas capacity	MMcfd Gas through-put	Process method	Production—1,000 gal/day (Average based on the past 12 months) Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
DENMARK											
Dansk Naturgas A/S—Nybro, Vest Jylland, Janderup	**405.0**	**150.0**	2	....	....	....	....	....	....	....	....
DOMINICAN REPUBLIC											
Falconbridge Dominicana C × A—*Bonao field, Arzo-Nouel Province, LaVega, La Peguera	NR	NR									[6]88.2 [10]189.0
Total	....	....		....	....	....	....	....	....	....	**277.2**
DUBAI											
Arco Oil & Gas Co.—Marghan	**330.0**	**300.0**		....	....	....	....	....	....	....	[11]**1,176.0**
ECUADOR											
Ministerio de Recursos Naturales y Energ.—											
Cepe-Ancon, Santa Elena field, Guayas	NR	NR	1					1.9	8.6		
Cepe-Cautivo plant, Santa Elena field, Guayas	NR	NR	1					0.5	0.5		
Total	....	....		....	....	....	....	**2.4**	**9.1**	....	....
EGYPT											
Amoco Egypt Oil Co.—Abu Gharadig/Dahshour, Abu Gharadig field, Western Desert, Block 30	125.0	104.0	7					15.8			[11]25.2
Egyptian General Petroleum Corp.—											
Abu Gharadig field, 286 km west of Cairo, Western Desert	148.0	137.0	5-6-7								[11]301.1
Abu Madi plant and field, El Mansora, Dakahita	191.0	189.0	6								[11]179.3
Abu Qir plant and field offshore, 60 km east of Alexandria	120.0	113.0	6								[11]126.0
Dahshour, Abu Gharadig field, 65 km west of Cairo, Helwan	137.0	130.0	6-7					107.9			
Ras-Shukeir	80.0	69.0	5-6-7					109.2			[11]63.0
Sinai, Balayim, Abu Rudies	25.0	22.0	3		0.2	0.2	0.2			0.1	[1]0.1
Total	**826.0**	**764.0**		....	**0.2**	**0.2**	**0.2**	**232.9**	....	**0.1**	**694.7**
FRANCE											
SNEA—Usine de Lacq	**900.0**	**867.0**	2	....	**160.0**	....	**165.0**	....	....	**415.0**	....
GERMANY											
Norddeutsche Erdgas Aufbereitungs GmbH—											
1—Scholen, Lower Saxony (near Sulingen)	38.0	21.0	1	(sulfur recovery only)							
2—Scholen, Lower Saxony (near Sulingen)	75.0	75.0	1	(sulfur recovery only)							
3—Scholen, Lower Saxony (near Sulingen)	205.0	175.0	1	(sulfur recovery only)							
Wintershall AG—Dueste 1, 2, 3, Staffhorst, Diepholz, Lower Saxony	NR	135.0	Sepasolv	(sulfur only)							
Ruetenbrock, Emsland, Lower Saxony	NR	45.0	Selexol	(sulfur only)							
Total	**542.9**	**451.0**									
GREECE											
North Aegean Petroleum Co.—Sigma site, Prinos and South Kavala field	27.0	26.2	1						83.0		
NGL plant	12.0	10.8	3								
Total	**39.0**	**37.0**		....	....	....	....	....	**83.0**	....	....
HUNGARY											
OKGT:											
Babócsa plant and field, Somogy	4.2	2.4	6								[9]0.4
Berekfurdo, Tatárulés-Kunmadaras, Szolnok	28.3	8.5	6								
Ebes plant and field, Hajdu-Bihar	8.5	2.3	6								[9]0.4
*Eger plant, Demjen field, Heves	5.1	1.7	5								[9]0.2
Hajduszoboszló plant and field, Hajdu-Bihar	77.7	66.0	2&4					31.5		13.6	[9]2.2
Kardoskut plant, Pusztafoldvar field, Bekes	42.4	23.4	3								[9]1.7
Kiskunhalas plant and field, Bacs-Kiskun	7.1	5.8	6								[9]0.3
Ortaháza plant and field, Zala	4.2	0.8	6								[9]0.3
Szank plant and field, Bács-Kiskun	77.7	31.7	3						23.1		
Szeged plant, Algyo field, Csongrad	435.0	248.0	2-3&6		140.0	3.0	136.5			148.5	[1]37.6 [9]282.0
Tázlár plant and field, Bács-Kiskun	28.3	4.2	6								[9]2.5
Ullés plant and field, Csongrad	70.0	50.0	6						87.4		
Total	**788.5**	**444.8**		....	**140.0**	**3.0**	**136.5**	**31.5**	**110.5**	**162.1**	**327.6**
INDONESIA											
Atlantic Richfield Indonesia Inc.—Ardjuna, nw Java Sea, 90 miles ne of Jakarta	230.0	140.0	7		569.0	355.0					
Petromer Trend Corp.—Arar, Kepala Burung, Irian Jaya	9.3	9.3	6								[11]12.5
Walio, Kepala Burung, Irian Jaya	1.9	1.5	6								[11]8.6
Petromina—Mundu, Jatibarang, West Java	35.0	23.5	3					33.0	16.2		
Rantau, North Sumatra	28.0	17.5	1					18.6			
Total Indonesie—Handil CPA, East Kalimantan	200.0	160.0	4								
*Handil LEX, East Kalimantan, Psc Mahakam	250.0	160.0	3						260.0		
*Senipah LEX, East Kalimantan, Psc Mahakam	12.0	9.8	1								[11]52.0
Senipah Tandem, East Kalimantan	22.0	13.3	4								

Company, plant, location	Gas capacity (MMcfd)	Gas throughput (MMcfd)	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Union Oil Co. of California—Santan LEX, Attaka, East Kalimantan	145.0	120.0	7	....	126.0	....	....	....	189.0	....	....
Total	**933.2**	**654.9**		....	**695.0**	**355.0**	....	**51.6**	**465.2**	....	**73.1**

Production—1,000 gal/day (Average based on the past 12 months)

ITALY

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
AGIP SPA—Brugherio, Po Valley	300.0	282.0	1								
Casalborsetti, Porto Garibaldi field, Bologna, Emilia-Romagna, Po Valley	794.0	455.0	1							0.2	
Casirate d'Adda, Malossa field, Bergamo, Lombardia, Po Valley	211.0	27.0	2					29.6	175.0		
Cortemaggiore, Piacenza, Po Valley	105.0	88.0	1								
Crotone, Luna field, Catanzaro, Calabria	265.0	132.0	1							0.1	
Falconara, Barbara 'A' field, Ancona	176.0	23.0	1								
*Gagliano, Emma, Sicily	141.0	15.0	5							7.6	
Grottammare, Emilio-David field, Ascoli Piceno	114.0	40.0	1&2							7.2	
Hera Lacinia, Crotone, Catanzaro	88.0	25.0	1								
Minerbio, Bologna, Po Valley	1,589.0	1,095.0	1							<0.1	
Pineto, Fratello-Squalo-Emma field, Roseto, Pescara	176.0	70.0	1								
Ravenna Mare, Porto Corsini Est-Angela fields, Bologna, Emilia Romagna, Po Valley	265.0	169.0	1							0.2	
Ripalta, Cremona, Po Valley	353.0	318.0	1								
Rubicone, Cervia and Cesenatico fields, Bologna, Emilia-Romagna, Po Valley	176.0	52.0	1							0.1	
Sergnano, Cremona, Po Valley	1,995.0	1,765.0	1								
Settala, Po Valley	353.0	353.0	1								
Total	**7,101.0**	**4,909.0**		....	....	....	....	**29.6**	**175.0**	**15.4**	....

KUWAIT

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Kuwait Oil Co.—Mina Al-Ahmadi	†	†	‡		(95.0)		(187.0)			(145.0)	
Mina Al-Ahmadi	1,680.0	360.0	2		834.0		548.0			305.0	¶85.0
Total	**1,680.0**	**360.0**		....	**834.0**	....	**548.0**	....	....	**305.0**	**85.0**

---

†100,000 b/d condensate capacity and 12,800 b/d throughput. ‡Fractionation. (Figures in parenthesis do not represent primary production, and are not included in totals). ¶Unsplit pentanes.

LIBYA

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Oasis Oil Co. of Libya Inc.—*Bahi, Concession 32	15.0	10.0	2&4								[11]160.0
*Dahra, Concession 32	140.0	20.0	2&4								[11]11.0
Defa, Concession 59 and 71	104.0	47.0	4								[11]210.0
Waha, Concession 59W	52.0	52.0	4								[11]170.0
Occidental of Libya, Inc.—103A, Sirte Basin Petroleum Zone II	670.0	450.0	3						666.0		
103D, Sirte Basin, Petroleum Zone II	420.0	255.0	3						375.0		
Socialist People's Libyan Arab Jamahirya, Marsa Brega	450.0	393.0	NR					37.8	4,536.0		
Total	**1,851.0**	**1,227.0**		....	....	....	....	**37.8**	**5,577.0**	....	**551.0**

MALAYSIA

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Petronas—Kerteh, Terengganu	**250.0**	**157.0**	2&5 6-7		**337.1**	**356.6**					**[11]417.3**

MEXICO

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Petroleos Mexicanos—Cactus 1-2-3-4, Chiapas	600.0	600.0	7	[1]1,786.4	[2]4,030.5						
Cactus, 5-6, Chiapas	1,000.0	1,000.0	7	(1)	(2)						
Ciudad Pemex A, Tabasco	550.0	515.0	2		[3]1,408.5						
Cuidad Pemex C, Tabasco	190.0	183.0	7		(3)						
La Venta A, Tabasco	205.0	192.0	2	[4]515.6	[5]1,150.0						
La Venta C, Tabasco	225.0	182.0	7	(4)	(5)						
Pajaritos, Coatzacoalcos, Veracruz	192.0	175.0	7	213.0	70.9						
Poza Rica, Veracruz	295.0	275.0	7	519.6	585.5						
Reynosa, Tamaulipas	550.0	345.0	2	119.8	280.0						
Total	**3,807.0**	**3,467.0**		**3,154.4**	**7,525.4**	....	....	....	....	....	....

---

1. Total ethane for all six Cactus plants. 2. Total propane. 3. Total C.P. propane plus. 4. Total La Venta ethane. 5. Total La Venta propane plus.

NETHERLANDS

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Amoco Netherlands Petroleum Co.—Alkmaar, (Koedijk), Bergen, North Holland	**440.0**	**350.0**	5	....	....	....	....	....	**6.0**	....	....

NEW ZEALAND

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
PetroCorp—Kapuni, Taranaki, Lot 1, Dp 5227, Sec. 11, B-XVI, Kaupokouni SD area 11.2.27	**96.0**	**59.0**	1-3-4	....	**23.6**	....	**3.2**	....	....	**7.9**	....

NORWAY

Company, plant, location	Gas capacity	Gas throughput	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
Amoco Norway Oil Co.—Valhall A, 56° 16' 41.395" North, 3° 23' 43.193" East	**350.0**	**79.6**	7	....	....	....	....	....	**160.0**	....	....

	MMcfd			Production—1,000 gal/day (Average based on the past 12 months)							
Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
PAKISTAN											
Oil and Gas Development Corp.—Sari-Hundi plant and field, Dadu district, Sind province	25.0	8.9	1	....	....	....	....	....	....	....	[11]<0.1
Pakistan Oilfields Ltd.—Meyel field, Attock district, Punjab province	40.0	20.0	1	....	....	....	....	....	....	....	[11]4.7
Meyel field, Attock district, Punjab province	75.0	22.0	7	....	....	....	....	47.0	....	7.6	....
Sui Gas Transmission CL—*Sibbi district, Baluchistan	670.0	630.0	1&5	....	....	....	....	....	....	....	[11]3.1
Sui Northern Gas Pipelines Ltd.—*Sibbi district Baluchistan	140.0	130.0	1	....	....	....	....	....	....	....	....
Total	**950.0**	**810.9**		....	....	....	....	**47.0**	....	**7.6**	**7.8**
PERU											
Petroleos del Peru—*Pariñas-Pozo-Verdun, Talara	**70.0**	**27.1**	2	....	....	....	**0.6**	**5.7**	....	**20.0**	[11]**1.8**
QATAR											
Qatar General Petroleum Corp.—											
Umm Said No. 1, Dukhan field, onshore	338.7	171.5	3	323.0	308.5	....	162.3	....	....	85.8	....
Umm Said No. 2, offshore	240.0	105.3	3	272.4	272.2	....	192.4	....	....	161.3	....
Total	**578.7**	**276.8**		**595.4**	**580.7**	....	**354.7**	....	....	**247.1**	....
SAUDI ARABIA											
Arabian American Oil Co.†—Abqaiq	580.0	NR	3-4	....	....	....	....	....	....	....	....
Berri	600.0	NR	1-2-3-4	....	....	....	....	....	....	....	....
Ras Tanura	120.0	NR	3-4	....	....	....	....	....	....	....	....
Shedgum	1,500.0	NR	3-4	....	....	....	....	....	....	....	....
Uthmaniyah	1,500.0	NR	7	....	....	....	....	....	1,176.0	....	....
Total	**4,300.0**	....		....	....	....	....	....	**1,176.0**	....	....

†Design capacity. Fractionation plants located at Ju'Aymah, Ras Tanura, and Yanbu.

	MMcfd			Production—1,000 gal/day (Average based on the past 12 months)							
Company, plant, location	Gas capacity	Gas through-put	Process method	Ethane	Prop.	Isobut.	Normal or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other
SHARJAH											
Amoco Sharjah Oil Co.—Sajaa field	**500.0**	**600.0**	7	....	....	....	....	....	....	....	[11]**2,436.0**
UNITED KINGDOM											
Amoco U.K.—Bacton, Leman 49/26 27-28&53/1-2	1,200.0	460.0	3								[11]11.3
Indefatigable 49/18 19-23&24, Norfolk Co.	600.0	308.0	3								[11]23.5
BP Petroleum Development UK Ltd.—Easington and West Sole, Block 48/6, Southern North Sea	300.0	168.0	1-2 4-5	....						....	[12]11.8
Kinneil, Forties Field	70.0	48.0	4	....	332.0	....	291.0		....	176.0	....
Total Oil Marine Ltd.—Saint Fergus, Frigg field, Grampian province	65.0	46.0	3	....	....	....			....	1,572.5	....
Total	**2,235.0**	**1,030.0**		....	**332.0**	....	**291.0**	....	....	**1,748.5**	**46.6**
VENEZUELA											
Corpoven											
Bajo Grande fractionation plant, Zulia	....	....	†	....	(93.2)	(43.3)	(118.4)	....	....	(79.8)	....
El Tablazo, Zulia	165.0	113.0	7	59.8	132.7	(17.6)	(48.3)	65.9	....	48.3	....
*Lama Liquido, Zulia	150.0	110.0	3	....	(93.2)	(18.1)	(49.1)	240.2	....	(79.8)	....
Lagoven											
Bachaquero 1, Zulia	440.0	390.0	4	....	....	....			31.3	....	....
Tia Juana 1, Zulia	230.0	220.0	1		....	....	....	....	15.6	....	....
Tia Juana 2, Zulia	450.0	400.0	3	....		....	....		719.3	....	....
Tia Juana 3, Zulia	455.0	410.0	3	....	....	....	....	....	797.5	....	....
Ule fractionation plant, Punta Gorda Zulia	....	....	†	....	(644.7)	(143.6)	(273.0)	....	....	(502.3)	....
Maraven											
La Paz, Zulia	150.0	130.0	1		58.8	(7.2)	(19.3)	85.3	....	37.0	....
Mara, Zulia	55.0	25.0	1	....	4.2	(0.4)	(1.7)	6.3	....	11.8	....
Meneven											
Guara Oeste, Anzoategui	42.0	24.0	1	....	....	....	....	12.6	....	16.8	....
Oficina, Anzoategui	9.0	1.0	1	....	....	....	....	....	0.8	3.4	....
Santa Rosa, Anzoategui	150.0	80.0	2	....	....	....	....	222.6	....	8.4	....
RLM, Anaco, Anzoategui	400.0	380.0	3	....	....	....	....	(168.0)	210.0	(42.0)	....
Total	**2,696.0**	**2,283.0**		**59.8**	**195.7**	....	....	**632.9**	**1,774.5**	**125.7**	....

---

†Parenthetical figures do not represent primary production, and are not added to totals. Bajo Grande plant fractionates products from Corpoven's Lama and El Tablazo plants and Maraven's La Paz and Mara plants. Ule plant fractionates all raw NGL mix from Lagoven plants. Meneven's RLM products fractionated in Santa Rosa plant.

OGJ REPORT

ETHYLENE REPORT

Area totals*

Area	1,000 metric tons year 1983	1984	1985
North America			
U S	17,543	17,073	17,298
Canada	1,561	1,561	2,242
Total	10,104	18,634	19,540
Latin America			
Argentina	253	253	253
Bolivia	230	230	230
Brazil	1,347	1,407	1,427
Chile	60	60	60
Columbia	115	115	115
Mexico	935	932	932
Puerto Rico	413	413	413
Venezuela	150	150	150
Total	3,500	3,560	3,580
Western Europe			
Austria	265	265	285
Belguim	520	520	520
Finland	165	200	200
France	2,590	2,270	2,270
West Germany	4,170	3,990	3,990
Greece	15	15	15
Italy	1,980	1,485	1,485
Netherlands	2,260	2,260	2,260
Norway	300	350	350
Portugal	300	300	300
Spain	956	956	956
Sweden	355	350	360
Switzerland	30	30	30
U K	2,265	2,270	2,270
Total	16,171	15,261	15,291
Asia Pacific			
Australia	335	420	420
China (Taiwan)	690	955	953
India	251	252	252
Japan	6,354	5,996	5,581
Korea	505	505	505
Singapore		300	300
Total	8,135	8,428	8,011
Other			
Algeria	120	120	120
Iran	26	26	26
Israel	24	24	24
Qatar	280	280	280
Saudi Arabia			1,611
South Africa	150	150	150
Turkey	55	55	55
Total	655	655	2,566
World Total	47,565	46,538	48,988

*As of June 1, 1985

World ethylene production

	Year 1984	1989	1994
	%		
Ethane	22	27	30
LPG	15	14	11
Naphtha	54	48	46
Gas oil	8	10	12
Other	1	1	1
	100	100	100
	Billion lb		
Total production	84	[illegible]	[illegible]

Source: DeWitt & [illegible]

Installed ethylene capacity: 1985*

Company	Location	Capacity 1,000 metric tons year	Feedstock*	Coproducts	Capacity 1,000 metric tons year§
Allied Corp (with Borg Warner & BASF-Wyandotte	Geismar, La	325	E, P	Propylene	21
				Butadiene	16
Amoco Chemicals Corp	Chocolate Bayou, Tex	975	E,P,B,N	Propylene	237
				Butadiene	91
				Py gas	332
				Aromatics	85
				Fuels	49
ARCO Chemical Co	Channelview, Tex	1,270	E,P,N,G	Propylene	846
				Butadiene	227
Corpus Christi Petrochemical Company	Corpus Christi, Tex	545	L,H,N,G	Propylene	256
				C_4	185
				Benzene	196
				Py gas	143
Cosden Oil & Chem	Groves, Tex	9	R	Propylene	30
Dow Chemical	Freeport, Tex	1,136	E,P,B,N	Propylene	250
				Butadiene	39
	Plaquemine, La	682	E,P,B,N	Propylene	75
Du Pont Petrochem	Alvin, Tex	682	E,P,B N,G	Propylene	545
				Aromatics	522
	Orange, Tex	375	E,P	Propylene	
				C_4	
El Paso Products Co	Odessa, Tex	236	E,P	Propylene	65
				Butadiene	4
				Aromatics	15
Exxon Chemical U S A	Baton Rouge, La	590	E,P N,G	Propylene	400
				Butadiene	
				Aromatics	
	Baytown, Tex	590	N,G	Propylene	408
				Butadiene	113
B F Goodrich	Calvert City, Ky	136	P	Propylene	90
Gulf Oil Chemical Co	Port Arthur, Tex	432	LPG	Propylene	165
				Butadiene	22
	Cedar Bayou, Tex.	730	E,P,N,G	Propylene	355
				Butadiene	190
				Py gas	60
Mobil Chemical Co	Beaumont, Tex	455	LPG,N	Propylene	110
				Butadiene	35
				Aromatics	35
Northern Petrochemical	Morris, Ill	430	E,P,B	Propylene	110
				Butadiene	15
				Py gas	25
	Clinton, Iowa	365	E,P	Propylene	14
				Butadiene	17
				Py gas	24
				Fuels	124
Olin Corp	Brandenberg, Ky	50	E,LPG		
Phillips Petroleum	Sweeney, Tex	1,143	NGL	Propylene	170
				Butadiene	44
Shell Chemical	Deer Park, Tex	1,318	NGL,R	Propylene	772
				Butadiene	227
				Aromatics	940
	Norco, La	1,018	NGL,R	Propylene	681
				Butadiene	227
				Py gas	—
Sun-Olin	Claymont, Del	109	R	NA	—
Texaco	Port Arthur, Tex	450	E,P,B,N	Propylene	225
	Port Neches, Tex	170	E,P,R	Propylene	66
				Butadiene	227
Texas Eastman	Longview, Tex	611	E,P,N	Propylene	284
				Aromatics	101
				C_4	68
Union Carbide	Seadrift, Tex	562	E,P	Propylene	46
				Butadiene	—
				Aromatics	—
	Taft, La	500	LPG,N	Propylene	193
				Butdiene	—
				Aromatics	—
	Texas City, Tex	702	LPG,N	Propylene	136
				Butadiene	—
				Aromatics	—
U S I	Tuscola, Ill	180	E		—
USS Chemicals	Houston, Tex	227	NGL,R	Propylene	54
Vista Chemical Co	West Lake, La	295	E	Propylene	8
				Butadiene	15
				Aromatics	8
U S Total		17,298			

(Continued on next page)

Installed ethylene capacity: 1985*—continued

Company	Location	Capacity 1,000 metric tons/year	Feedstock*	Coproducts	Capacity 1,000 metric tons/year§
ALGERIA					
Sonatrach	Skikda	120	LH	—	—
ARGENTINA					
Duperial S.A.I.C.	San Lorenzo	15	N	Propylene	6
				Butadiene	6
				Py gas	6
				Fuel oils	5
Ipako	Ensenada	15	R	—	—
PASA Petroquimia Arg.	Pto. Gral. San Martin	23	P	—	—
Petroquimica Bahia Blanca	Bahia Blanca	200	E,P	Propylene	20
				C_4	14
				Py gas	9
Argentina Total		253			
AUSTRALIA					
Altona Petrochem. Co. Ltd.	Altona, Victoria	170	E,G	Propylene	50
				Butadiene	17
ICI Australia	Botany, NSW	250	N,LPG	Propylene	95
				Butadiene	23
				Fuel oils	12
				Py gas	58
Australia Total		420			
AUSTRIA					
OMV A.G.	Schwechat	285	B,N,G	Propylene	150
				Butadiene	50
				Py gas	230
BELGIUM					
Petrochem S.A.	Antwerp	520	N	Propylene	230
				Butadiene	65
				Aromatics	230
				Fuel oils	85
				Py gas	150
BOLIVIA					
Yacimientos Petroliferos Bolivianos	La Paz	230	E,P	Propylene	56
				Py gas	22
BRAZIL					
Brasiliera de Estireno	Sao Paulo	5	EtOH		
Industrias Quimicas Electro Cloro	Sao Paulo	10	EtOH		
Copene Petroquimica	Camarcari-Bahia	460	N,G	Propylene	243
				Butadiene	55
				Py gas	341
				Aromatics	163
				Fuel oils	92
Copesul	Triunfo RGS	420	N	Propylene	227
				Butadiene	66
				Py gas	192
				Aromatics	176
Coperbo	Cabo	32	EtOH	—	—
Petroquimica Uniao S.A.	Capuava-Santo Andre	360	N	Propylene	204
				Py gas	96
				Butadiene	50
				Aromatics	244
Salgema Industrias Quimicas S.A.	Maceio-Alagoas	100	EtOH	—	—
Union Carbide	Cubatao	40	EtOH	—	—
Brazil Total		1,427			
CANADA					
Alberta Gas Ethylene	Joffre, Alta.	1,224	E	Propylene	35
				Butadiene	51
Dow Chemical	Sarnia, Ont.	50	P,B,R	Propylene	—
Imperial (Esso Chemical)	Sarnia, Ont.	220	NGL	—	—
Petromont	Varennes, Que.	225	N	Propylene	—
	Montreal East	68	P,R	Propylene	60
				Butadiene	2
				Py gas	2
				Aromatics	6
Petrosar Ltd.	Corunna (Sarnia), Ont.	455	E,N,G	Propylene	330
				Butadiene	91
				Aromatics	125
Canada Total		2,242			
CHILE					
Empressa Nacional Del Petr.	Talcahuano	60	N	—	—
CHINA					
Chinese Petro. Corp.	Koahsiung	899	N	Propylene	485
				Butadiene	130
China Pet. Dev. Corp.	Toufen	54	E	—	—
China Total		953			
COLOMBIA					
Empresa Colombiana	Barrancabermeja	115	E,R	Propylene	9
				Py gas	5
FINLAND					
Neste Oy	Porvoo	200	N,G,R	Propylene	90
				Py gas	180
				C_4	20
FRANCE					
Atochem	Lacq	110	NGL	—	—
& Chloe Chimie	Gonfreville	375	N	Propylene	190
	Feyzin	200	N	Propylene	115
				Aromatics	115
	Carling St. Avoid	440	N,G	Propylene	220
				C_4	140
				Py gas	420
				Aromatics	150
				Fuel oils	80
Copenor	Dunkerque	225	N,G,LPG	Propylene	110
				C_4	75
				Py gas	70
				Aromatics	80
				Fuel oils	50
Napthachimie	Lavera	240	LPG,N	Propylene	155
				Butadiene	50
Shell Chimie	Berre	380	N,G,LH	Propylene	190
				Butadiene	75
Esso Chimie	Notre Dame de Gravenchon	300	N,R	Propylene	220
				Butadiene	70
				Py gas	310
France Total		2,270			
GERMANY					
BASF A.G.	Ludwigshafen	450	N	Propylene	240
				C_4	220
				Py gas	264
Caltex Deutschland	Frankfort	250	N	Propylene	120
				C_4	60
				Py gas	210
				Fuels	38
Deutsche Marathon	Burghausen	280	E,P,N	Propylene	130
				C_4 cuts	80
				Benzene	110
Deutsche Texaco A.G.	Heide	80	N	Propylene	55
				C_4	28
Erdolchemie G.m.b.H.	Worringen	740	N	Propylene	520
				Butadiene	245
				Py gas	880
Esso Chemie G.m.b.H.	Cologne	450	N	Propylene	240
				C_4	38
Rheinische Olefinwerke	Wesseling	650	N,G	Propylene	300
				Butadiene	150
Union Rheinische Braun-Kohlen Kraftstoff A.G.	Wesseling	440	N	Propylene	260
				C_4	150
				Py gass	595
				Fuels	165
Ruhr Oel A.G.	Gelsenkirchen	400	N	Propylene	360
Veba Oel	Munchsmunster	200	N	Propylene	130
Chemische Werke Huls	Marl	50	LPG	—	—
Germany Total		3,990			
GREECE					
EKO Chemicals Co.	Thessaloniki	15	N	—	—
INDIA					
Alkali & Chemical Corp.	Rishra, W. Bengal	12	EtOH	—	—
Chemicals & Plastics India	Krishnagiri	19	EtOH	—	—
McDowell & Co.	Visakhapatnam	3	EtOH	—	—
Indian Petrochem Corp.	Vadodera	130	N	Propylene	51
				Butadiene	22
				Benzene	24
				Py gas	601
				Fuel oils	16
National Organic Chemicals Industries Ltd.	Thana, Bombay	63	N	Propylene	37
				Butadiene	7
Polychem Ltd.	Bombay	2	EtOH	—	—
	Nira	4	EtOH	—	—
Reliance Textile Ind.	Bombay	22	N	Propylene	6
				Benzene	3
				Aromatics	5
				Fuel oils	6
India Total		252			
IRAN					
Abadan Petrochemical	Abadan	26	R	Propylene	15
ISRAEL					
Israel Petrochemical Enterprises	Haifa	24	N,LPG	—	—

Installed ethylene capacity: 1985*—continued

Company	Location	Capacity 1,000 metric tons/year	Feedstock*	Coproducts	Capacity 1,000 metric tons/year§
ITALY					
Enichem	Gela	200	E,N	Propylene	160
				Butadiene	40
				Py gas	280
				Aromatics	150
				Fuel oils	55
	Priolo	215	N	Propylene	150
	Brindisi	130	N	Propylene	85
				Butadiene	120
	Porto Torres	240	N	Propylene	121
				Butadiene	50
ICAM	Priolo	550	N,G	Propylene	350
Montedison	Porto Marghera	350	N	Propylene	180
Italy Total		1,485			
JAPAN					
Idemitsu Petrochem Co., Inc.	Tokuyama	380	N	Propylene	220
Maruzen Petrochem Co., Inc.	Chiba	372	N	Propylene	220
				Butadiene	55
				Aromatics	180
				Fuels	300
Mitsubishi Chemical Industries	Mizushima	177	N,LPG	Propylene	144
Mitsubishi Petrochemical Co., Inc.	Kashima	325	N	—	—
	Yokkaichi	227	N	—	—
Mitsui Petrochemical Inds.	Chiba	140	N	Propylene	68
				Py gas	90
				Fuel oils	30
	Iwakuni-Ohtake	92	N	Propylene	69
				Py gas	64
Mizushima-Ethylene	Mizushima	360	N,LPG	Propylene	216
				Py gas	250
				Fuel oils	50
Nippon Petrochemicals	Kawasaki	190	N,LPG	Propylene	148
				Butadiene	50
Osaka Petrochemicals Inds.	Osaka	300	N,B	Propylene	200
				Aromatics	225
				Butadiene	50
				Py gas	250
				Fuel oils	30
Sanyo Ethylene Co	Mizushima	390	N	Propylene	254
Shin Daikyowa Petrochemical Co.	Yokkaichi	361	N,B,P	Propylene	220
				Py gas	300
				Aromatics	169
Showa Denko, K.K.	Oita	320	N,LPG	Propylene	170
				Butadiene	45
				Py gas	200
				Aromatics	160
Sumitomo Chem. Co. Ltd.	Chiba	345	N,LPG	Propylene	259
	Nihama	139	N	Propylene	123
Tonen Petrochemical Co., Ltd.	Kawasaki	573	N,LPG	Propylene	
				Butadiene	
Ukishima Petrochem Co., Ltd.	Kawasaki	889	N	Propylene	600
				Py gas	237
				Aromatics	148
Japan Total		5,581			
KOREA					
Honam Ethylene Co.	Yeochun	350	N,G,LPG	Propylene	187
				C_4	128
				Aromatics	148
Yukong Ltd. (formerly Korea Oil)	Ulsan	155	N	Propylene	81
				Butadiene	24
				Aromatics	70
				Py gas	128
				Fuels	18
Korea Total		505			
MEXICO					
Petroleos Mexicanos	Congrejera	500			
	Pajaritos	209	E		
	Posa Rica	182	R		
	Reynosa	27	LH		
	Ciudad Madero	14	R		
Mexico Total		932			
NETHERLANDS					
Dow Chemical Europe	Terneuzan	960	N	Propylene	450
				Benzene	600
				Butadiene	150
DSM	Limburg	800	N,G,LPG	Propylene	450
				Benzene	150
				Butadiene	90
Shell Nederland Chemie BV	Moerdijk	500	N,G	Propylene	300
				Butadiene	115
				Py gas	400
				Fuel oils	450
Netherlands Total		2,260			
NORWAY					
I/S Noretyl	Rafnes	300	NGL	Propylene	70
				Py gas	35
PORTUGAL					
Companhia Nacional de Petroquimica	Sines	300	LPG,N	Propylene	140
				Butadiene	42
				Py gas	220
				Fuel oils	24
PUERTO RICO					
Union Carbide Caribe, Inc.	Ponce	413	N,LPG	Propylene	227
QATAR					
Qatar Petrochemical	Umm Said	280	E	Propylene	5
SAUDI ARABIA					
Saudi Petro-Chemical Co	Al-Jubail	656	E	—	—
Arabian Petrochemical Co	Al-Jubail	500	E	—	—
Saudi Yanbu Petrochem Co	Yanbu	455	E	—	—
Saudi Arabia Total		1,611			
SINGAPORE					
Singapore Petrochemical	Singapore	300	LPG,N	Propylene	—
SOUTH AFRICA					
So. Africa Coal, Oil & Gas Co	Sasolburg	150	Syn. gas	Propylene	120
				Butadiene	27
				Aromatics	20
SPAIN					
Dow	Tarragona	350	N	Propylene	130
				Butadiene	50
				Py gas	300
Enpetrol	Puertollano	210	LPG,N,G	Propylene	100
				Butadiene	28
				Py gas	155
				Fuel oils	45
	Tarragona	325	LPG,N	Propylene	150
				Butadiene	45
				Py gas	260
				Fuel oils	70
Industrias Quimicas Asociadas S.A.	Tarragona	71	N	Propylene	36
				Butadiene	7.5
				Aromatics	40
Spain Total		956			
SWEDEN					
Esso Chemical A.B.	Stenungsund	360	LPG,N,G	Propylene	170
				C_4cut	100
				Py gas	170
				Fuel oils	70
SWITZERLAND					
Lonza, A.G.	Visp	30	N,LPG	Acetylene	
TURKEY					
Petkim Petrokimya A.S.	Izmit	55	N	Propylene	40
				C_4	26
				Py gas	58
				Fuel oils	8
	Izmir	300	N	Propylene	151
				C_4	80
				Py gas	250
Turkey Total		355			
UNITED KINGDOM					
BP Chemicals	Baglan Bay	340	N	Propylene	200
				Butadiene	60
	Grangemouth	250		Propylene	180
				Butadiene	48
BP/ICI	Wilton	650	N	Propylene	300
				Butadiene	80
Esso Chemical Ltd	Fawley	105	N,G	Propylene	100
				Butadiene	80
Imperial Chemical	Wilton	775	N	Propylene	—
				Butadiene	—
Shell Chemicals U.K. Ltd	Carrington	150	N,G,LPG	Propylene	90
				Butadiene	30
U.K. Total		2,270			
VENEZUELA					
Pequiven	El Tablazo	150	E,P	Propylene	94
WORLD TOTAL					
*(As of June 1, 1985)		48,988			

* Key: E = ethane P = propane B = butane R = refinery streams N = naphtha G = gas oil LH = light hydrocarbons NGL = natural gas liquids (ethane, propane, butane) LPG = liquefied petroleum gas (propane, butane) EtOH = ethanol

§ Coproduct production is only estimated or design quantity. Actual production can vary widely depending on feedstock slate, severity, etc.

Worldwide sulfur derived from oil and gas

Ailleen Cantrell
Director of Editorial Surveys

As of Jan. 1, 1985

Company and location	Source	Metric tons/day	
		Design capacity	Production
ABU DHABI			
Abu Dhabi National Oil Co.			
Thammama C Bab	natural gas	800.0	....
ARGENTINA			
Duperial			
San Lorenzo	acid gas	44.2	9.3
Electroclor SAIC			
Capitan Bermudez, Santa Fe	carbon tet	10.4	6.5
AUSTRALIA			
Australian Oil Refining PL			
Kurnell, NSW	refinery	70.0	11.5
Petroleum Refineries Australia PL			
Adelaide	refinery gas	17.9	9.5
Altona	refinery gas	24.6	1.4
Shell Refining (Australia)			
Clyde, NSW	gas treater	75.0	30.0
Geelong, Victoria	gas treater	80.0	50.0
AUSTRIA			
OeMV AG			
Aderklaa	natural gas	32.0	20.0
Schwechat	refinery gas	185.0	98.0
BAHAMAS			
Bahamas Oil Refining Co.			
Freeport	refinery gas	180.0	....
BAHRAIN			
Bahrain Petroleum Co. BSC (Closed)			
Sitra	refinery	150.0	142.0
BELGIUM			
Belgian Refining Corp.			
Antwerp	refinery gas	108.5	....
Esso Belgium NV			
Antwerp	refinery gas	350.0	177.0
SIBP			
Antwerp	refinery	225.0	60.0
BRAZIL			
Petrobras			
Recap—Capuava, SP	crude oil	25.0	....
Refap—Canoas, RS	crude oil	20.0	....
Regap—Betim, MG	crude oil	20.0	....
Repar—Araucária, PR	crude oil	65.0	....
Replan—Paulinia, SP	crude oil	60.0	....
Revap—São Jose Campos, SP	crude oil	150.0	....
Petroflex SA			
Duque de Caxias, RJ	refinery acid gas	40.0	30.0
Ultrafertil SA			
Araucária, PR	resid asphalt	57.8	30.0
Cubatão, SP	refinery acid gas	45.0	29.7
CANADA			
Amoco Canada Petroleum CL			
Bigstone, Alberta	natural gas	382.0	250.0
East Crossfield, Alberta	natural gas	1,797.0	1,350.0
West Whitecourt, Alberta	natural gas	1,200.0	1,200.0
Canadian Occidental Petroleum Ltd.			
Paddle River, Alberta	natural gas	25.4	8.3
Canadian Superior Oil Ltd.			
Harmattan, Alberta	natural gas	430.0	161.8
Lone Pine Creek South, Alberta	natural gas	119.0	62.8
Canterra Energy Ltd.			
Nordegg River, Alberta	natural gas	39.0	23.0
Okotoks, Alberta	natural gas	376.0	350.0
Rainbow Lake, Alberta	oil and gas	152.4	80.0
Ram River, Alberta	natural gas	4,580.3	3,000.0
Chevron Canada Ltd.			
Burnaby, B.C.	refinery gas	10.0	1.0
Chevron Canada Resources Ltd.			
Kaybob, South Alberta	natural gas	3,200.0	1,094.0
Dome Petroleum Ltd.			
Caroline, Alberta	natural gas	18.0	6.0
Edson, Alberta	natural gas	297.0	100.0
Kaybob II, Alberta	natural gas	1,097.0	250.0
West Pembina, Alberta	natural gas	300.0	285.0
Esso Resources Canada Ltd.			
Joffre	solution gas	28.9	6.0
Quirk Creek	natural gas	294.0	119.0
Redwater	solution gas	25.0	12.4
Gulf Canada Products Co.			
Clarkson, Ontario	refinery gas	40.0	9.0
Edmonton, Alberta	refinery gas	56.0	16.0
Port Moody, British Columbia	refinery gas	25.0	6.0
Gulf Canada Resources Inc.			
Hanlan-Robb, Alberta	natural gas	1,100.0	470.0
Nevis, Alberta	natural gas	162.7	128.0
Rimbey, Alberta	natural gas	333.0	100.0
Strachan, Alberta	natural gas	1,000.0	515.0
Mobil-GC Canada Ltd.			
Teepee Creek, Alberta	natural gas	30.0	12.0
Mobil Oil Canada Ltd.			
Wimborne, Alberta	solution gas	340.0	79.0
PanCanadian Petroleum Ltd.			
Morley, Alberta	natural gas	18.2	12.5
Petro-Canada Exploration Inc.			
Gold Creek, Alberta	natural gas	100.0	15.0
Wildcat Hills, Alberta	natural gas	170.0	80.0
Petrogas Processing Ltd.			
Calgary, Alberta	natural gas	1,700.0	900.0
Saratoga Processing CL			
Coleman, Alberta	natural gas	400.0	190.0
Shell Canada Ltd.			
Sarnia, Ontario	refinery gas	35.0	15.0
Vancouver, British Columbia	refinery gas	15.0	5.0
Shell Canada Resources Ltd.			
Burnt Timber, Alberta	natural gas	490.0	434.0
Innisfail, Alberta	natural gas	160.0	58.0
Jumping Pound, Alberta	natural gas	570.0	412.0
Rosevear, Alberta	natural gas	160.0	69.0
Simonette, Alberta	natural gas	260.0	52.0
Waterton, Alberta	natural gas	2,900.0	2,030.0
Sulconam Inc.			
Montreal East, Quebec	refinery gas	300.0	135.0
Sulpetro			
Minnehik-Buck Lake, Alberta	natural gas	38.6	12.0
Suncor Inc.			
Ft. McMurray, Alberta	tar sands	730.0	250.0
Rosevear, Alberta	natural gas	....	40.0
Sarnia, Ontario	refinery gas	....	14.0
Syncrude Canada Ltd.			
Mildred Lake, Alberta	tar sands	820.0	575.0
Texaco Canada Inc.			
Nanticoke, Ontario	refinery	35.0	10.0
Texaco Canada Resources Ltd.			
Bonnie Glen, Alberta	natural gas	15.0	10.0
Westcoast Transmission CL			
Fort Nelson, British Columbia	natural gas	660.0	220.0
Pine River, Hasler Flats, B.C.	natural gas	1,070.0	300.0
Taylor, British Columbia	natural gas	460.0	190.0
Western Decalta Petroleum Ltd.			
Hartell, Alberta	natural gas	....	10.7
CHINA, TAIWAN			
Chinese Petroleum Corp.			
Kaohsiung	refinery gas	255.0	77.4
Tao-Yuan	refinery gas	155.0	0
COLOMBIA			
Empresa Colombiana de Petroleos			
Barrancabermeja	refinery	80.0	35.0
DENMARK			
A/S Dansk Shell			
Fredericia	refinery	25.0	8.7
Kuwait Petroleum Refining (Danmark)			
Gulfhavn	refinery gas	50.0	18.0
EGYPT			
Ameria Petroleum Refining Co.			
Suez	refinery	....	3.0
General Petroleum Co.			
Eastern Desert	natural gas	....	8.0
FINLAND			
Neste Oy			
Naantali	refinery gas	43.0	28.0
Porvoo	refinery gas	215.0	145.0
FRANCE			
Compagnie Francaise de Raffinage			
Gonfreville l'Orcher	refinery	190.0	111.0
La Mede	refinery	190.0	87.0
Mardyck	refinery	127.0	23.0
Compagnie Rhenane de Raffinage			
Reichstett	refinery	70.0	25.0

World petroleum-derived sulfur production — continued

Company and location	Source	Metric tons/day	
		Design capacity	Production
Elf France			
Donges	refinery	210.0	42.8
Feyzin	refinery	118.0	36.5
Grandpuits	refinery	125.0	27.9
Esso SA Francaise			
Fos-sur-Mer	refinery	149.0	36.0
Mobil Oil Francaise			
Frontignan	refinery gas	72.0	13.0
Shell Francaise			
Berre	refinery	189.0	50.0
Pauillac	refinery	720.0	25.0
Petit-Couronne	refinery	189.0	30.0
Ste. Francaise des Petroles BP			
Lavera	refinery gas	122.0	. . . .
Ste. Francaise Hoechst			
Port Jerome	refinery gas	240.0	. . . .
Ste. Nationale Elf Aquitaine			
Lacq	natural gas	. . . .	4,240.0
GERMANY			
Deutsche BP			
Vohburg	refinery	60.0	20.0
Deutsche Marathon			
Burghausen	refinery gas	41.3	*11.0
Deutsche Shell			
Godorf	refinery	150.0	67.6
Harburg	refinery	78.5	20.6
Deutsche Texaco			
Heide	refinery gas	57.0	19.0
Erdgasaufbereitungsanlage			
Grossenkneten	natural gas	2,100.0	1,527.0
Erdol-Raffinerie Neustadt GmbH & Co. oHG			
Neustadt-Donau	refinery	86.0	25.0
Esso			
Hamburg	refinery	80.0	24.0
Ingolstadt	refinery	50.0	27.0
Karlsruhe	refinery	100.0	40.0
Mobil Oil AG			
Wilhelmshaven	refinery gas	100.0	18.0
Woerth	refinery	60.0	12.0
Norddeutsche Erdgas-Aufbereitungs			
Sulingen	natural gas	1,050.0	725.0
Oberrheinische Mineralolwerke GmbH			
Karlsruhe	refinery gas	175.0	. . . .
Ruhr Oel GMBH			
Gelsenkirchen	refinery	415.0	. . . .
Saarland-Raffinerie GmbH			
Volklingen	refinery	25.0	4.0
Union Rheinische Braunkohlen Kraftstoff AG,			
Wesseling	refinery gas	250.0	. . . .
Wintershall AG			
Dueste	natural gas	320.0	200.0
Lingen	refinery gas	72.0	60.0
Mannheim	refinery gas	52.0	. . . .
*Annual.			
GREECE			
Hellenic Aspropyrgos Refinery SA			
Aspropyrgos, Attiki	refinery gas	40.0	35.0
Motor Oil Hellas			
Corinth	refinery	90.0	10.0
HUNGARY			
Danube Petroleum Refining Co.			
Szazhalombatta	crude oil	55.0	32.0
Tisza Petroleum Refining Co.			
Leninvaros	crude oil	19.0	19.0
ISRAEL			
Oil Refineries Ltd.			
Ashdod	refinery gas	50.0	30.0
Haifa	refinery gas	50.0	30.0
ITALY			
API-Raffineria di Ancona SpA			
Falconara	refinery gas	40.0	30.0
Esso Italiana			
Augusta	refinery gas	104.0	52.0
Trecate	refinery	40.0	30.0
Industria Italiana Petroli			
Rho	refinery gas	30.0	18.8
Taranto	refinery gas	121.0	51.5
Irom			
Porto Marghera	refinery	20.0	. . . .
Isab			
Melilli	refinery	310.0	. . . .
Mobil Oil Italiana			
Naples	refinery	70.0	13.0
Raffineria del Po			
Sannazzarro	refinery	80.0	. . . .
Saras			
Sarroch	refinery gas	120.0	50.0
Stanic			
Livorno	refinery	21.0	. . . .
Tamoil Italia			
Cremona	refinery	42.0	14.8
IVORY COAST			
Societe Ivoirienne de Raffinage			
Abidjan-Vridi	refinery gas	40.0	. . . .
JAPAN			
Asia Kyoseki Co.			
Sakaide	refinery gas	265.0	. . . .
Asia Oil CL			
Hakodate	refinery gas	2.3	. . . .
Yokohama	refinery gas	200.0	. . . .
Cosmo Oil CL			
Chiba	refinery gas	600.0	182.0
Sakai	refinery gas	140.0	46.0
Yokkaichi	refinery gas	200.0	76.0
Fuji Oil CL			
Sodegaura, Chiba	refinery gas	240.0	180.0
General Sekiyu KK			
Kawasaki	refinery gas	85.4	2.1
Sakai	refinery gas	374.0	68.2
Idemitsu Kosan CL			
Aichi	refinery gas	400.0	188.0
Chiba	refinery gas	560.0	232.8
Hokkaido	refinery gas	50.0	35.0
Hyogo	refinery gas	230.0	100.1
Tokuyama	refinery gas	235.0	43.2
Kashima Oil CL			
Kashima	refinery gas	420.0	110.0
Koa Oil CL			
Marifu	refinery gas	80.0	35.0
Osaka	refinery gas	60.0	35.0
Kyokuto Petroleum Industries Ltd.			
Chiba	refinery gas	215.0	67.0
Nichimo Sekiyu KK			
Kawasaki	refinery	22.6	. . . .
Nippon Mining CL			
Mizushima	refinery	400.0	227.0
Nagoya, Aichi	refinery	150.0	45.0
Nippon Petroleum Refining CL			
Muroran	refinery gas	420.0	202.0
Negishi	refinery gas	320.0	186.0
Nippon Steel Chemical CL			
Oita	BTX refining	3.0	3.0
Tobata	coke oven gas	2.1	2.1
Seibu Oil Co.			
Yamaguchi	refinery	320.0	. . . .
Showa Oil Co.			
Kawasaki	fuel oil	80.0	. . . .
Showa Yokkaichi Seikyu KK			
Yokkaichi	refinery gas	280.0	. . . .
Toa Nenryo Kogyo KK			
Kawasaki	refinery gas	295.3	79.8
Shimizu	refinery gas	9.8	0
Wakayama	refinery gas	169.3	58.4
Toa Oil Co.			
Kawasaki	refinery gas	330.0	151.0
KOREA			
Ssangyong Refining CL			
Onsan	refinery gas	43.8	27.0
KUWAIT			
Kuwait National Petroleum Co.			
Mina Abdullah	refinery gas	165.0	150.0
Mina Al-Ahmadi	refinery gas	*534.0	200.0
Shuaiba	refinery gas	†1,200.0	300.0
*Two identical units—each 267 t/d.			
†Two identical units—each 600 t/d.			
MEXICO			
Petroleos Mexicanos			
Azcapotzalco, DF	refinery gas	22.6	13.1
Cactus, Chis	natural gas	1,591.2	720.0
Cuidad Madero, Tamps	refinery gas	54.8	21.0
Ciudad Pemex, Tab.	natural gas	650.9	352.8
Matapionche, Ver.	natural gas	27.1	14.5
Poza Rica, Ver	natural gas	126.6	89.9
Salamanca, Gto	refinery gas	153.4	19.6
Salina Cruz, Oax.	refinery gas	71.2	13.3
Totonaca, Tams.	natural gas	27.1	2.1
Tula, Hgo	refinery gas	153.7	17.0
NETHERLANDS			
BP Raffinaderij Nederland NV			
Rotterdam	refinery gas	172.0	43.0
Esso Nederland			
Rotterdam	refinery gas	76.0	20.0
Kuwait Petroleum Europoort BV			
Europoort	refinery gas	50.0	32.0

World petroleum-derived sulfur production — continued

Company and location	Source	Metric tons/day Design capacity	Metric tons/day Production
Shell Nederland Raffinaderij			
Rotterdam	refinery	540.0	169.9
Texaco			
Pernis	refinery gas	90.0	....
NETHERLANDS ANTILLES			
Shell Curacao			
Curacao	refinery	120.0	74.0
NORWAY			
Norsk Hydro a.s.			
Porsgrunn	fuel oil	8.0	8.0
Norske Shell a.s.			
Sola	refinery	20.0	3.1
Rafinor a.s.			
Mongstad	refinery gas	13.0	12.0
OKINAWA			
Okinawa Sekiyu Seisei CL			
Okinawa City	refinery	300.0	180.0
PORTUGAL			
Petrogal			
Lisbon	cat cracking gas	30.0	0
Sines	refinery gas	100.0	23.2
PUERTO RICO			
Yabucoa Sun Oil Co			
Yabucoa	sour crudes	30.0	26.0
QATAR			
Qatar Petrochemical Co.			
Umm Said	acid gas	46.0	33.0
SAUDI ARABIA			
Petromin			
Berri	associated gas	1,200.0	800.0
Shedgum	associated gas	1,700.0	1,000.0
Saudi Arabian Fertilizer Co.			
Dammam	acid gas	40.0	40.0
SINGAPORE			
Esso Singapore PvL			
Jurong	refinery	126.0	16.3
Mobil Oil Singapore PL			
Jurong	refinery gas	132.0	28.0
Shell Eastern Petroleum			
Pulau Bukom	refinery	220.0	....
Singapore Petroleum CPvL*	refinery gas	97.7	29.0
Singapore Refining Co.	refinery	*217.0	65.0
Jurong	....	....	....
*45% share in design capacity			
SOUTH AFRICA			
Mobil Refining Co. of Southern Africa PL			
Durban	refinery gas	70.0	....
National Petroleum Refiners of South Africa PL			
Sasolburg	refinery gas	90.0	....
Shell & BP South Africa Petroleum Refineries PL			
Durban	refinery gas	106.0	....
SPAIN			
Empetrol			
Escombreras	hydrogen sulfide	28.0	....
Puertollano	hydrogen sulfide	80.0	3.3
Tarragona	hydrogen sulfide	105.0	12.4
Explosivos Rio Tinto SA			
La Rabida, Huelva	refinery gas	12.0	5.0
Petroliber			
La Coruña	refinery gas	24.0	14.4
Petronor			
Muskiz, Vizcaya	refinery gas	71.4	20.0
SWEDEN			
BP Raffinaderi Goteburg AB			
Gothenburg	refinery gas	6.0	
Svenska Shell			
Gothenburg	refinery	27.0	9.3
Skandinaviska Raffinaderi AB			
Lysekil	refinery fuel	225.0	65.0
SWITZERLAND			
Shell Switzerland			
Cressier	refinery	20.0	7.5
TRINIDAD			
Texaco Trinidad Inc.			
Pointe-a-Pierre	refinery gas	250.0	35.0
TURKEY			
Tupras—Izmit Refinery			
Izmit	refinery gas	15.0	12.0
UNITED KINGDOM			
Amoco U.K.			
Milford Haven	refinery	76.0	....
BP Oil			
Grangemouth	refinery gas	100.0	....
Llandarcy	refinery gas	45.0	....
Conoco Ltd			
South Humberside	refinery gas	50.0	35.0
Esso Petroleum CL			
Fawley	hydrodesulf/ cat plant	270.0	38.0
Gulf Oil Refining Ltd			
Milford Haven	refinery gas	10.0	4.1
Lindsey Oil & Refining Ltd.			
Killingholm, South Humberside	refinery gas	120.0	60.0
Mobil Oil CL			
Coryton	refinery gas	200.0	25.0
Pembroke Cracking Co.			
Pembroke	refinery gas	160.0	2[illegible]
Shell U.K. Oil			
Shell Haven	refinery gas	30.0	7.8
Stanlow	refinery gas	120.0	25.6
UNITED STATES			
American Petrofina of Texas			
Port Arthur, Texas	refinery	182.0	60.0
Amoco Oil Co.			
Mandan, North Dakota	refinery	15.0	....
Texas City, Texas	refinery	1,400.0	....
Whiting, Indiana	refinery	400.0	....
Yorktown, Virginia	refinery	56.0	....
Amoco Production Co.			
Andrews County, Texas	natural gas	33.0	....
Ector County, Texas	natural gas	30.0	....
Eddy County, New Mexico	natural gas	36.0	....
Freemont County, Wyoming	natural gas	61.0	....
Hockley County, Texas	natural gas	43.0	....
Park County, Wyoming	natural gas	76.0	....
Van Zandt, Texas	natural gas	313.0	....
Uinta County, Wyoming	natural gas	1,205.0	....
Wood County, Texas	natural gas	30.0	....
Ashland Petroleum Co.			
Canton, Ohio	refinery	101.6	15.9
Catlettsburg, Kentucky	refinery	203.2	75.1
St. Paul Park, Minnesota	refinery	42.7	11.9
Atlantic Richfield			
Carson, Calif.	refinery gas	171.0	....
Cherry Point, Washington	refinery gas	170.0	....
Houston, Texas	refinery gas	350.0	....
Philadelphia, Pennsylvania	refinery gas	170.0	....
BP Oil Corp.			
Marcus Hook, Pennsylvania	refinery gas	160.0	....
Cenex			
Laurel, Montana	refinery gas	48.7	20.0
Champlin Petroleum Co.			
Corpus Christi, Texas	crude oil	204.0	110.0
Charter International Oil Co.			
Houston, Texas	refinery gas	181.8	63.3
Chevron U.S.A. Inc.			
Carter Creek, Wyo	natural gas	907.0	
El Paso, Texas	refinery gas	42.0	....
El Segundo, California	refinery gas	750.0	....
Pascagoula, Mississippi	refinery gas	1,090.0	....
Perth Amboy, New Jersey	refinery gas	200.0	....
Richmond, California	refinery gas	600.0	....
Salt Lake City, Utah	refinery gas	12.0	....
Citgo Petroleum Corp.			
Lake Charles, Louisiana	crude oil	330.0	300.0
Cities Service Co.			
Lignite, North Dakota	natural gas	14.0	5.0
Milnesand, New Mexico	natural gas	23.0	8.0
Myrtle Springs, Texas	natural gas	304.0	95.0
West Seminole, Texas	natural gas	10.0	5.0
Coastal Refining & Marketing Inc.			
Corpus Christi, Texas	refinery gas	85.0	49.0
Colorado Interstate Gas Co.			
Table Rock, Wyoming	natural gas	89.6	22.0
Conoco			
Commerce City, Colorado	refinery gas	19.0	13.0
Westlake, Louisiana	refinery gas	220.0	161.0
Cosden Oil & Chemical Co.			
Big Spring, Texas	refinery	50.0	46.0
Crown Central Petroleum Corp.			
Pasadena, Texas	refinery	14.0	11.0
Diamond Shamrock Corp.			
Moore County, Texas	natural gas	30.5	18.2
El Paso Hydrocarbons Co.			
Foster, Ector County, Texas	natural gas	20.0	12.2

World petroleum-derived sulfur production — continued

Company and location	Source	Metric tons/day Design capacity	Metric tons/day Production
El Paso Natural Gas Co.			
Eunice, Lea County, New Mexico	natural gas	64.3	32.2
Goldsmith, Ector County, Texas	natural gas	144.8	39.0
Jal 4, Lea County, New Mexico	natural gas	23.0	14.7
McElroy, Crane County, Texas	natural gas	88.0	26.6
San Juan River plant, Texas	natural gas	52.8	22.6
Exxon Co.			
Atascosa County, Texas	natural gas	...	9.4
Baton Rouge, Louisiana	crude	480.0	252.4
Baytown, Texas	crude	863.0	487.1
Benicia, California	crude	288.0	114.3
Crane County, Texas	natural gas	...	18.8
Escambia County, Alabama	natural gas	...	892.1
Linden, New Jersey	crude	290.0	105.8
Santa Rosa County, Florida	natural gas	...	299.8
Farmland Industries Inc.			
Coffeyville, Kansas	refinery	10.0	
Fletcher Oil & Refining Co.			
Carson, California	refinery gas	10.0	3.0
Gary Refining Co.			
Fruita, Colo.	refinery gas	12.2	4.1
Gulf Oil Corp.			
Belle Chasse, Louisiana	refinery gas	48.8	...
Cincinnati, Ohio	refinery gas	10.1	...
Philadelphia, Pennsylvania	refinery gas	46.7	...
Port Arthur, Texas	refinery gas	469.3	...
Santa Fe Springs, California	refinery gas	28.0	...
Hawaiian Independent Refinery Inc.			
Ewa Beach, Hawaii	refinery gas	14.0	3.6
Hunt Refining Co.			
Tuscaloosa, Alabama	refinery gas	80.0	22.3
Husky-RMT Properties			
Cheyenne, Wyoming	refinery gas	50.8	14.0
Koch Hydrocarbon Co.			
McKenzie County, North Dakota	natural gas	100.0	70.0
Koch Refining Co.			
Corpus Christi, Texas	process gas	50.0	10.0
St. Paul, Minnesota	process gas	425.0	425.0
LaGloria Oil & Gas Co.			
Tyler, Texas	refinery	9.5	4.1
Louisiana Land & Exploration Co.			
Saraland, Ala.	refinery	54.9	0
Mapco Petroleum Inc.			
Memphis, Tennessee	refinery gas	43.0	9.0
Marathon Oil Co.			
Detroit, Michigan	refinery	80.0	30.0
Eddy County, New Mexico	natural gas	25.4	20.3
Garyville, Louisiana	refinery	480.0	150.0
Pecos County, Texas	natural gas	50.0	45.0
Robinson, Illinois	refinery	40.0	25.0
Mobil Oil Corp.			
Beaumont, Texas	refinery	100.0	63.0
Ferndale, Washington	refinery	19.5	12.0
Joliet, Illinois	refinery	315.0	280.0
Paulsboro, New Jersey	refinery	135.0	71.0
Paulsboro, New Jersey*	refinery	135.0	...
Torrance, California	refinery	200.0	140.0
Torrance, California*	refinery	100.0	...
*Standby units.			
Montana Sulfur & Chemical Co.			
East Billings, Montana	refinery gas	225.0	100.0
Murphy Oil Corp.			
Meraux, Louisiana	refinery gas	35.0	12.0
Superior, Wisconsin	refinery gas	14.0	7.0
Newhall Refining Cl			
Newhall, California	refinery	7.5	7.0
Northern Natural Gas Co.			
Hobbs, New Mexico	natural gas	35.0	4.0
Pennzoil Products Co.			
Shreveport, La.	refinery gas	11.7	2.5
Phillips Petroleum Co.			
Andrews, Texas	acid gas	...	12.0
Borger, Texas	acid gas	142.0	87.0
Buckeye, New Mexico	acid gas	...	19.0
Chatom, Alabama	acid gas	193.0	103.0
Fullerton, Texas	acid gas	61.0	53.0
Hopkins County, Texas	natural gas	30.5	8.2
Stamps, Arkanasas	acid gas	...	15.0
Sweeny, Texas	acid gas	275.0	196.0
Williams County, North Dakota	natural gas	150.0	85.1
Williston, North Dakota	acid gas	28.0	3.0
Rock Island Refining Corp.			
Indianapolis, Indiana	refinery gas	20.3	3.1
Shell Oil Co.			
Cass County, Texas	natural gas	175.0	...
Clarke County, Mississippi	natural gas	40.0	...
Deer Park, Texas	refinery	410.0	...
Karnes County, Texas	natural gas	16.0	...
Manistee County, Michigan	natural gas	25.0	...
Martinez, California	refinery	195.0	...
Norco, Louisiana	refinery	45.0	...
Rankin County, Mississippi	natural gas	1,245.0	...
Wilmington, Calif.	refinery	200.0	...
Wood River, Illinois	refinery	300.0	...
Sid Richardson Carbon & Gasoline Co.			
Ector County, Texas	natural gas	...	7.0
Winkler County, Texas	natural gas	20.0	10.0
Sinclair Oil Corp.			
Sinclair, Wyoming	crude	25.4	13.5
Smackover-Shell Ltd.			
Henderson County, Texas	natural gas	660.0	...
Standard Oil Co. of Ohio			
Lima, Ohio	refinery gas	34.0	...
Toledo, Ohio	refinery gas	120.0	...
Tenneco Oil Processing and Marketing			
Chalmette, Louisiana	refinery gas	360.0	120.0
Texaco Inc.			
Anacortes, Washington	refinery	50.0	...
Bakersfield, California	refinery gas	20.0	7.0
Convent, Louisiana	refinery	660.0	...
Delaware City, Delaware	refinery gas	325.0	229.0
El Dorado, Kansas	refinery gas	117.0	46.0
Franklin County, Texas	natural gas	224.0	61.0
Freestone County, Texas	...	112.0	61.0
Lawrenceville, Illinois	refinery	15.0	...
Mobile County, Alabama	...	12.0	0
Port Arthur, Texas	refinery	292.0	...
Westville, New Jersey	refinery	32.0	...
Wilmington, California	refinery	347.0	...
Texas Oil & Gas Corp.			
Coyanosa, Texas	natural gas	20.0	10.0
Pittsburg, Texas	natural gas	100.0	44.0
Teague, Texas	natural gas	10.0	6.0
Tosco			
Martinez, California	refinery gas	181.5	100.0
Total Petroleum Inc.			
Alma, Michigan	refinery gas	13.2	6.6
Trans-Jeff Chemical Corp.			
Tilden, Texas	sour gas treat	95.0	26.1
Union Oil Co. of California			
Lemont, Illinois	refinery gas	400.0	...
Nederland, Texas	refinery gas	17.0	...
Rodeo, California	refinery gas	350.0	...
Santa Maria, California	refinery gas	69.0	...
Wilmington, California	refinery gas	200.0	...
Valero Refining Co.			
Corpus Christi, Texas	refinery	378.0	296.0
Warren Petroleum Co.			
Como, Hopkins County, Tex.	natural gas	...	3.7
Fashing, Atascosa County, Tex.	natural gas	...	35.0
Little Knife, Billings County, N.D.	natural gas	...	90.0
Monument, Lea County, N.M.	natural gas	...	15.0
Sand Hills, Crane County, Tex.	natural gas	...	52.6
VENEZUELA			
Corpoven			
El Palito, Carabobo	refinery	42.0	18.0
Lagoven			
Amuay, Falcon	refinery	600.0	210.0
Maraven			
Cardon, Falcon	refinery	94.0	21.0

OGJ international refining-catalyst compilation

Catalytic naphtha reforming

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
AMERICAN CYANAMID CO.								
Aeroform® PHF-5 & PHF-5A	Monometallic; differing particle size.	Naphtha	Gasoline or BTX	Cyl.	~ 42	Alumina	"P"	Licensees of Amoco Oil's Ultraforming process.
PRHF-30 PRHF-37 PRHF-50 PRHF-58	Bimetallic, but different amounts of active metals	Naphtha	Gasoline or BTX	Cyl.	"P"	Alumina	"P"	Licensees of Amoco Oil's Ultraforming process.
KX-120 KX-130 KX-160	See Exxon Research & Engineering							Licensees of Exxon's Powerforming process.
Trilobe® KX-130	See Exxon Research & Engineering Shaped extrudate							Licensees of Exxon's Powerforming process.
Aeroform® PHF-4 & PHF-4A	Monometallic; different particle sizes.	Naphtha	Gasoline or BTX	Cyl.	~ 42	Alumina	Platinum chloride	✓
Trilobe® P-8 & P-8A	Monometallic, high particle density, shaped catalyst; different particle sizes	Naphtha	Gasoline or BTX	Shaped, ext.	~ 44	Alumina	Platinum chloride	✓
Aeroform® PR-6 & PR-6A	Bimetallic; different particle sizes.	Naphtha	Gasoline or BTX	Cyl.	~ 42	Alumina	Platinum/rhenium/chloride	✓
Trilobe® PR-8, PR-8A & PR-8E	Bimetallic, high particle density shaped catalyst; different particle sizes.	Naphtha	Gasoline or BTX	Shaped ext.	~ 44	Alumina	Platinum/rhenium/chloride	✓
Trilobe® PR-18 & PR-18A	Bimetallic, high particle density shaped catalyst, skewed metals levels; different particle sizes	Low sulfur naphtha	Gasoline or BTX	Shaped ext.	~ 44	Alumina	Platinum/rhenium/chloride	✓
IMP-RNA-2	(See Instituto Mexicano del Petroleo Listing)			Shaped ext.				Licensees of IMP
CHEVRON RESEARCH CO.								
Rheniforming Type F	Latest version, long cycle life stable product yields	Petroleum naphthas (SR and cracked) coal naphthas	Mogas and aromatics	Cyl.	40	"P"	Pt/Re	Licensees Chevron Rheniforming process
Type E	1975 version, improved carrier	"	"	Cyl.	41	"P"	Pt/Re	"
CYANAMID KETJEN								
CK-303 CK-304 CK-305 CK-306	All monometallics, but different active metal contents	Naphtha	Gasoline or BTX	Cyl.	44	Alumina	Platinum/chloride	✓
CK-433	Bimetallic	Naphtha	Gasoline or BTX	Cyl.	44	Alumina	Platinum/rhenium/chloride	✓
CK-522 Trilobe®	Bimetallic, high particle density, shaped catalysts	Naphtha	Gasoline or BTX	Shaped exts.	45	Alumina	Platinum/rhenium/chloride	✓
PHRF-30	Multimetallic	Naphtha	Gasoline or BTX	Cyl.	"P"	Alumina	"P"	Licensees of Amoco Oil's Ultraforming process
CK-473	High-rhenium catalyst	Naphtha	Gasoline or BTX	Cylinder	44	Alumina	Platinum/rhenium/chloride	✓
KX-120 KX-130 KX-160	See Exxon Research & Engineering							Licensees of Exxon's Powerforming process
ENGELHARD CORP.								
E-301	Moderate stability	A-1 naphthas with feed sulfur < 5 ppm wt.	Motor fuel or aromatics	Cyl.	45	Gamma alumina	Platinum	License/sale
E-302	More stable than E-301	All naphthas with feed sulfur less than 10 ppm wt	Motor fuel or aromatics	Cyl.	45	Gamma alumina	Platinum	License/sale
E-311	Maximize LPG production	All naphthas with feed sulfur < 5 ppm wt	LPG and motor fuel	Cyl.	45	Gamma alumina	Platinum	License/sale
E-601	High stability	All naphthas with feed sulfur < 1 ppm wt	Motor fuel or aromatics	Cyl.	45	Gamma alumina	Platinum & Rhenium	License/sale
E-603	High stability. Lower metal loading than E-601.	All naphthas with feed sulfur < 1 ppm wt	Motor fuel or aromatics	Cyl.	45	Gamma alumina	Platinum & Rhenium	License/sale

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
E-611	Very high stability	All naphthas with feed sulfur <0.5 ppm wt	Motor fuel or aromatics	Cyl.	45	Gamma/ Alumina	Platinum Rhenium	License/sale
E-801	Equivalent stability to E603 at higher activity	All napathas with feed sulfur < 1ppm wt.	Motor fuel or aromatics	Cyl.		Gamma/ Alumina	Platinum/ Rhenium	License/✓
E-802	Equivalent stability to E611 at higher activity	All naphthas with feed sulfur <= 0.5 ppm wt.	"	"		"	"	"
E-803	Equivalent stability to E 611 at higher activity with lower metals loading	"	"	"		"	"	"
E-804	Equivalent stability and activity to E-801	"	"	"		"	"	"
(Note: Preceeding catalysts available in higher density at 49.5 lb/cu ft. They are designated HD, for example E – 301 HD).								
EXXON RESEARCH & ENGINEERING CO.								
KX-120	Multimetallic catalyst for semiregen. or cyclic units; different promotor	Virgin/cracked naphthas	High octane motor gas & aromatics	—	—	—	Pt, etc.	Powerforming: Process license through certified vendors.
KX-130	", different promotor	"	"	—	—	—	—	"
KX-160	", different promotor	"	"	—	—	—	—	"
INSTITUTO MEXICANO DEL PETROLEO								
IMP-RNA-1	High activity bimetallic catalyst	Desulfurized naphtha, aromatic production	BTX aromatics, high octane gasoline	Cyl.	0.70 g/cc	Al_2O_3	Pt/Re	Licensees
IMP-RNA-2	"	Desulfurized naphtha, aromatic production	BTX aromatics, high octane gasoline	Trilobe® exts.	0.70 g/cc	Al_2O_3	Pt/Re	"
KATALYSATOREWERKE HUELS AG								
H 2440		Fraction 35-195 °C.	Gasoline, BTX	Cyl. exts.	0.8 kg/l	Al_2O_3	Pt, 0.3-0.8% monometallic	✓
H 6413		"	"	"	0.6 kg/l	"	"	✓
H 2462		"	"	"	0.6 kg/l	"	Pt, 0,3-0,8% + "P"	✓
PROCATALYSE								
RG 402	H.P. reformer	Naphtha	Gasoline	Cyl.		Al_2O_3	Pt 0.6%	✓
RG 412	H.P. reformer	Naphtha	Gasoline	Cyl.		Al_2O_3	Pt 0.35%	✓
RG 422	M.P. reformer	Naphtha	Gasoline	Cyl.		Al_2O_3	Pt 0.6% + Ir	✓
RG 432	M.P. reformer	Naphtha	Gasoline	Cyl.		Al_2O_3	Pt 0.35% + Ir	✓
RG 482	M.P. & L.P. reformer	Naphtha	Gasoline	Cyl.		Al_2O_3	Pt 0.3% + Re	✓
RG 442	Reformer	Naphtha	Gasoline & LPG	Cyl.		Al_2O_3	Pt 0.35% + Ir + promotor	✓
RG 451	Continuous regeneration reformer	Naphtha	Gasoline	Sph.		Al_2O_3	Pt 0.35% + Ir + promotor	✓
CR 201	Continuous regeneration reformer	Naphtha	Gasoline	Sph.		Al_2O_3	Pt 0.35% + Sn	✓
AR 401	Continuous regeneration reformer (Aromizing-IFP)	Naphtha	Aromatics	Sph.		Al_2O_3	Pt 0.6% + promotor	Licensees
UOP INC.								
R-8	Monometallic, oxidized	Unhydrotreated naphtha semi-regenerative	Gasoline, aromatics	Sph.	32	Alumina	Pt	Licensees
R-9	Higher activity monometallic, oxidized	Semi-regen. or swing reactor	Gasoline, aromatics	Sph.	32	Alumina	Pt	Licensees
R-11	Higher activity monometallic, reduced and sulfided	Semi-regen. or swing	Gasoline, aromatics	Sph.	32	Alumina	Pt	Licensees
R-12	Monometallic, higher stability than R-11, reduced and sulfided	Semi-regen.	Gasoline, aromatics	Sph.	32	Alumina	Pt	Licensees
R-55	Monometallic, higher activity and stability than R-12, reduced and sulfided	Semi-regen. or swing	Gasoline, aromatics	Ext.	Dense-loaded 52	Alumina	Pt	Licensees
R-15	Monometallic, reduced and sulfided	Semi-regen.	LPG, gasoline	Sph.	32	Silica/ Alumina	Pt	Licensees
R-16H	Bimetallic, higher stability than monometallics, reduced and sulfided	High severity, semi-regen.	Gasoline, aromatics	Sph.	32	Alumina	Pt/Re	Licensees
R-16F	Bimetallic, low Pt, higher stability than monometallics, reduced and sulfided	High severity, semi-regen.	Gasoline, aromatics	Sph.	32	Alumina	Pt/Re	Licensees
R16G	Bimetallic, higher activity and stability than R-16F and H, Reduced and sulfided	High severity, semi-regen.	Gasoline, aromatics	Sph.	32	Alumina	Pt/Re	Licensees

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
R-18	Bimetallic, higher activity and stability than R-16 series, reduced and sulfided	High severity, semi-regen	Gasoline, aromatics	Sph	37	Alumina	Pt/Re	Licensees
R-22	Bimetallic, higher yields than Pt/Re, reduced state	Continuous catalyst regeneration (CCR) or Semi-regen.	Higher production of octane-barrels and aromatics	Sph	32	Alumina	"P"	Licensees
R-30	Bimetallic, higher yields and activity than Pt/Re, higher Pt than R-32, reduced state.	CCR or swing reactor	"	Sph	35	Alumina	"P"	Licensees
R-32	Bimetallic, higher yields and activity than Pt/Re, reduced state	CCR	"	Sph	35	Alumina	"P"	Licensees
R-50	Bimetallic, higher activity and stability than R-16 series, reduced and sulfided	High severity, semi-regen	Gasoline, aromatics	Ext.	Dense loaded 52	Alumina	Pt/Re	Licensees
R-60	Bimetallic, higher stability than R-50, high activity, reduced and sulfided	High severity, semi-regen.	Gasoline, aromatics	Sph	45	Alumina	Pt/Re	Licensees
R-62	Bimetallic, Lower Pt than R-60, higher stability than R-50, high activity, reduced and sulfided	High severity, semi-regen.	Gasoline, aromatics	Sph	45	Alumina	Pt/Re	Licensees

Dimerization catalysts

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
PROCATALYSE								
LC 1252		Propylene butylene	Gasoline hexenes octenes	Liquid	—	—	Ni	Licensees IFP Dimersol processe

Isomerization C_4 catalysts

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
BP								
BP Isom	High activity, regenerable		Cyl.		Alumina	Platinum chloride	Licensees of BP	Isomerization process
UOP INC.								
I-4	High activity for n-butane isomerization to iso-butane			Sph.	33.5	Alumina	Pt	Licensees
I-8	Higher activity than I-4 for n-butane isomerization to iso-butane			Ext.	50	Alumina	Pt	Licensees
ENGELHARD CORP.								
RD-290C	Regenerable			Cyl.	48	Alumina	Pt	Sale to BP C_4 Isomerization process licensees

Isomerization (C_5 & C_6) catalysts

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
BP								
BP Isom	High activity, low pressure operation, regenerable	C_5 and/or C_6 fractions		Cyl.		Alumina	Platinum chloride	Licensees of BP Isomerization process
ENGELHARD CORP.								
RD-290C	Regenerable	C_5 and/or C_6 paraffins		Cyl.	48	Alumina	Pt	Sale to BP C_5/C_6 isomerization process licensees
UNION CARBIDE CORP.								
HS-10	Non-chloride activated catalyst with high tolerance for feed impurities	Isom. of C_5/C_6 fraction for octane upgrading		Cyl.	46	Molecular sieve alumina	Pt	Licensees of Hysomer Process or Total Isomerization Process (TIP)
UOP INC.								
I-4	High activity catalyst	Desulfurized LSR fractions; reformate light fractions		Sph.	34	Alumina	Pt	Licensees
I-7	High activity, sulfur and water tolerant	SR or HDT, Ext. C_5/C_6 streams		Ext.	35	"P"	Pt	
I-8	High activity catalyst for low pressure application	"		Cyl.	50	Alumina	Pt	Licensees

Isomerization (xylenes) catalysts

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
ENGELHARD CORP.								
O-750	Isomerizes ethyl-benzene to xylenes	C_8 aromatics	Para-xylene and/or ortho-xylene	Cyl.	"P"	"P"	Platinum	Octafining II process licensees

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
UOP INC.								
I-9	High activity & high selectivity. High ethylbenzene conversion	Mixed xylenes, ethylbenzene from reformate or pygas	Para-xylene	Sph.	38	"P"	"P"	Licensees

Fluid catalytic cracking

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
AKZO CHEMIE/AKZO CHEMIE AMERICA/KETJEN CATALYSTS								
Ketjen Low-Coke® series	Low delta coke, low generation temp.	Normal FCC feed, light resid	Gasoline, middle destil., alkyl feedstock	M.S.	0.78/0.82 g/cc		Low RE zeolite	✓
KLC-83	ASTM-MAT.: 73 wt%, S.A.: 170 sq m/g	"	"	"	0.82 g/cc		"	"
KLC-85	ASTM-MAT.: 76 wt%, S.A.: 190 sq m/g	"	"	"	0.80 g/cc		"	"
KLC-87	ASTM-MAT.: 79 wt%, S.A.: 210 sq m/g	"	"	"	0.78 g/cc		"	"
MZ-7 series	Low delta coke, low regenerator temp.	Conventional feed, light resid	Gasoline, alky feedstock	microsph.	0.82 g/cc (ABD)		zeolite	✓
MZ-7	ASTM-MAT*, 72 wt%; surface area, 120 sq m/g	"	"	"	"		"	✓
MZ-7X	ASTM-MAT, 78; wt% surface area, 140 sq m/g	"	"	"	"		"	✓
MZ-7 Super	ASTM-MAT, 83 wt%; surface area, 180 sq m/g	"	"	"	"		"	✓
Ketjen Multi-Crack® series	Maximum total distillates, bottoms conversion	VGO resid	Gasoline, LCO octane-cetane	M.S.	0.78-0.80 g/cc	Active matrix	Low RE zeolites	✓
KMC-23	ASTM-MAT.: 78 wt%, S.A.: 200 sq m/g	"	"	"	0.80"	"	"	"
KMC-25	ASTM-MAT.: 80 wt%, S.A.: 220 sq m/g	"	"	"	0.78"	"	"	"
KMC-27	ASTM-MAT.: 82 wt%, S.A.: 240 sq m/g	"	"	"	0.76"	"	"	"
KMC-55	ASTM-MAT.: 80 wt%, S.A.: 245 sq m/g	"	"	"	0.78"	"	"	"
MZ-11 series	Maximum total distillates, bottoms conversion	VGO and similar; resid and passivator	Gasoline and LCO, low cycle oil densities. Octane & cetane.	microsph.	0.75 g/cc (ABD)		zeolite matrix	✓
MZ-101	ASTM-MAT*, 72 wt%; surface area, 160 sq m/g	"	"	"	"		"	✓
MZ-11	ASTM-MAT, 76 wt%; surface area, 180 sq m/g	"	"	"	"		"	✓
MZ-11X	ASTM-MAT, 78 wt%; surface area, 200 sq m/g	"	"	"	"		"	✓
MZ-11 Super	ASTM-MAT, 80 wt%; surface area 220 sq m/g	"	"	"	"		"	✓
Ketjen Octa-Boost series	High octane, low coke and gas	VGO, heavy resid	High severity octane, high severity resid	M.S.	0.73/0.77 g/cc	matrix	Ultra stable zeolites	✓
KOB-605	ASTM-MAT.: 67 wt%, S.A.: 240 sq m/g	"	"	"	0.75"	"	"	"
KOB-607	ASTM-MAT.: 70 wt%, S.A.: 27C sq m/g	"	"	"	0.73"	"	"	"
KMC-25 plus/y	ASTM-MAT.: 73wt%, S.A.: 230 sq m/g	"	"	"	0.77"	"	Ultra stable low RE zeolites	"
Ketjen Metal-Resist® series	Metal resistance, bottoms conversion, low delta coke	High metals, heavy resids	LCO octane	M.S.	0.75/0.87 g/cc	V + Ni trap	Low RE zeolites	✓
KMR-903	ASTM-MAT.: 73 wt%, S.A.: 190 sq m/gr	"	"	"	0.87"	"	"	"
KMR-905	ASTM-MAT.: 77 wt%, S.A.: 210 sq m/gr	"	"	"	0.85"	"	"	"
KMR-907	ASTM-MAT.: 81 wt%, S.A.: 230 sq m/gr	"	"	"	0.83"	"	"	"
KMR-series	Max. metal resistance bottoms conversion low delta coke	Metal rich resid other heavy feeds	Low cycle oil densities	microsph.	0.75 g/cc (ABD)		zeolite, V-trapping matrix	✓
KMR-93	ASTM-MAT*, 72 wt%; surface area, 160 sq m/g	"	"	"	"		"	✓
KMR-95	ASTM-MAT, 78 wt%; surface area, 190 sq m/g	"	"	"	"		"	✓
KMR-97	ASTM-MAT, 83 wt%; surface area 220 sq m/g	"	"	"	"		"	✓
* Conversion after 100% steam deactivation for 17 hr at 750° C								
CATALYSTS & CHEMICALS INDUSTRIES C[illegible] LTD.								
MRZ-210	Low activity and high liquid yield	FCC feed	Gasoline & LCO	Microsph.	0.74 g/cc	Sio$_2$/Al$_2$O$_3$	Zeolite	✓
MRZ-220	High liquid yield	"	"	"				
MRZ-230	"	"	"	"				
MRZ-203	High octane & hi[illegible]ls tolerance	FCC feed	Gasoline	Microsph.	0.74 g/cc	Sio$_2$/Al$_2$O$_3$	Zeolite	✓
MRZ-204	"	"	"	"	"	"	"	
MRZ-206	"	"	"	"	0.72 g/cc	"	"	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
MRZ-203S	High octane, high metal tolerance & high hydrothermal stability	FCC feed & high metals feedstocks	Gasoline	Microsph	0.74	SiO_2/Al_2O_3	Zeolite	
MRZ-204S	"	"	"	"	"	"	"	
MRZ-206S	"	"	"	"	0.70	"	"	
MRZ-240	High gasoline yield & high metal tolerance	FCC feed & high metals feeds	Gasoline	Microsph	0.74 g/cc	SiO_2/Al_2O_3	Zeolite	✓
MRZ-260	"	"	"	"	0.70	"	"	
MRZ-060	"	"	"	"	0.70 g/cc	"	"	✓
SZ-C	Low active & high octane	FCC feed	Gasoline	Microsph.	0.45g/cc	"	"	
SZ-H	"	"	"	"	0.42	"	"	
HA	"	"	"	"	0.42	"		
DAVISON CHEMICAL DIVISION, W. R. GRACE & CO.								
CBZ-1*	General purpose, increased LCO yield	Gas oil, mild resid	Gasoline & distillate	Microsph.	0.55 g/cc (ABD)	"P"	Zeolite/Matrix	✓
CBZ-4	"	"	"	"	0.58 g/cc (ABD)	"P"	"	✓
DA-440*	Maximum unit retention, high stability, bottoms cracking	Gas oil, resid	Gasoline & distillate	Microsph.	0.79 g/cc (ABD)	"P"	Zeolite/Matrix	✓
DA-400	"	"	"	"	0.80	"	"	"
DA-300	"	"	"	"	0.82	"	"	"
DA-250	"	"	"	"	0.85		"	"
DA-200	"	"	"	"	0.85	"	"	"
DAB-400*	Maximum retention and bottoms upgrading, high stability	Gas oil, resid, coker gas oils, high nitrogen feeds	Gasoline & distillate	Microsph.	0.80 g/cc (ABD)	"P"	Zeolite/Matrix	✓
DAB-300	"	"	"	"	0.82 "	"	"	"
DAB-250	"	"	"	"	0.84 "	"	"	"
DZ-8	General purpose, bottoms cracking, low ABD for circulation sensitive units	Gas oil, mild residu	Gasoline & distillate	Microsph.	0.54 g/cc (ABD)	"P"	Zeolite/Matrix	✓
*Catalyst arranged in decreasing order of activity.								
GX-30*	Bottoms cracking, nitrogen and metals tolerance	Gas oil, resid, coker gas oils, high nitrogen feeds	Gasoline & distillate	Microsph	0.73 g/cc (ABD)	"P"	Zeolite/Matrix	✓
GX-20	"	"	"	"	0.76	"	"	"
GX-10	"	"	"	"	0.78	"	"	"
*Catalysts arranged in decreasing order of activity								
GXO-28*	Octane enhancement, bottoms coker cracking, coke selectivity, excellent stability	Gas oil, resid, gas oils, high nitrogen feeds	Gasoline & distillate	Microsph	0.75 g/cc (ABD)	"P"	Zeolite/Matrix	✓
GXO-40	"	"	"	"	0.75	"	"	"
GXO-25+	"	"	"	"	0.76	"	"	"
GXO-25	"	"	"	"	0.76	"	"	"
GXO-27	"	"	"	"	0.77	"	"	"
*Catalysts arranged in decreasing order of activity								
Super Nova-D*	Coke selectivity, octane enhancement, stability, maximum unit retention, bottoms cracking	Gas oil, resid, coker gas oils, high nitrogen feeds	Gasoline & distillate	Microsph.	0.76 g/cc (ABD)	"P"	Zeolite/Matrix	✓
Nova-D	"	"	"	"	0.78 g/cc (ABD)	"	"	"
*Catalysts arranged in decreasing order of activity.								
Nova-SX*	Coke and gas selectivity at moderate cost	Gas oil, resid	Gasoline & distillate	Microsph.	0.75 g/cc (ABD)	"P"	Zeolite/Matrix	✓
Nova-S	"	"	"	"	"	"	"	"
*Catalyst arranged in decreasing order of activity.								
Octacat+*	Maximum octane enhancement and stability, minimum coke make	Gas oil, resid, coker gas oils	Gasoline & distillate	Microsph.	0.68 g/cc (ABD)	"P"	Zeolite/Matrix	✓
Octacat	"	"	"	"	0.68	"	"	"
Octacat-2	"	"	"	"	0.70	"	"	"
Octacat-3	"	"	"	"	0.72	"	"	"
*Catalysts arranged in decreasing order of activity.								
Octacat-D*	Maximum retention version of octacat series with improved bottoms cracking	Gas oil, resid, coker gas oils, high nitrogen feeds	Gasoline & distillate	Microsph.	0.74 g/cc (ABD)	"P"	Zeolite/Matrix	✓
Octacat-D2	"	"	"	"	0.76	"	"	"
Octacat-D3	"	"	"	"	0.78	"	"	"
*Catalysts arranged in decreasing order of activity.								
RC-25*	High liquid product selectivity, high isobutane yield, metals tolerance	Gas oil, resid	Gasoline, distillate	Microsph	0.73 g/cc (ABD)	"P"	Zeolite/Matrix	✓
Super-D Magnum	"	"	"	"	0.73	"	"	"
Super-D Extra	"	"	"	"	0.75	"	"	"
Super-D	"	"	"	"	0.76		"	"
Super-D2	"	"	"	"	0.77	"	"	"
Super-D3	"	"	"	"	0.78	"	"	"
Super-D4	"	"	"	"	0.80	"	"	"
*Catalysts arranged in decreasing order of activity.								
Titan	Moderate activity, low-priced catalyst for metals contaminant control	Gas oil, resid	Gasoline & distillate	Microsph.	0.79 g/cc (ABD)	"P"	Zeolite/Matrix	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
Additive O	Additive for gasoline octane enhancement	Gas oil, resid	High octane gasoline	Microsph.	0.70 g/cc (ABD)	"P"	Zeolite/Matrix	✓
DVT	Additive for vanadium and passivation	Resid	Maintain conversion liquid product selectivity	Microsph.	0.62 g/cc	"P" (ABD)	Matrix	✓
CROSFIELD CATALYSTS								
CBZ1, 2, 3, 4	(See Davison Chemical listing)							✓
Super D, D2, D3, D4, Super D Extra	(See Davison Chemical listing)							✓
XL series	Retention by increased density and attrition resistance Hydrothermal stability, high coke selectivity and resistance to metals poisoning. Reduced SOX emissions, four activity levels	Gas oils	High gasoline yield and LCO make. Reduced slurry yields. Octane, diesel yield					✓
XL-60	"	"	"	Microsph.	0.87 g/ml (ABD)	Silica alumina	Zeolite + matrix	✓
XL-80	"	"	"	microsph.	0.87 g/ml (ABD)	"	"	✓
XL-90	"	"	"	microsph.	0.86 g/ml (ABD)	"	"	✓
XL-100	"	Gas oils	"	microsph.	0.85 g/ml (ABD)	"	"	✓
XLS-1	High hydrothermal stability and metals tolerance, three activity levels	Gas oil and residual oils	Selectivity for gasoline and LCO	microsph.	0.85 g/ml (ABD)	Silica alumina	Zeolite + matrix	✓
XLS-2	"	"	"	"	0.86 g/ml (ABD)	"	"	✓
XLS-3	"	"	"	"	0.87 g/ml (ABD)	"	"	✓
SLS-60	High coke selectivity, octane enhancement, 3 activity levels	Gas oils and residual oils	Selectivity for gasoline and LCO	Microsph.	0.78 g/ml	Silica alumina	Zeolite + matrix	✓
SLS-80	"	"	"	"	0.76 g/ml	"	"	✓
SLS-100	"	"	"	"	0.76 g/ml	"	"	✓
Quantum	Maximum octane enhancement	Gas oils and residual oils		"	0.73 g/ml	"	"	✓
CBZ-1, 2, 3, 4	(See Davison Chemical listing)							
Super D, D2, D3, & Super D Extra D4,	(See Davison Chemical listing)							
ENGELHARD CORP.								
ULTRASIV®-280/280P ULTRASIV®-260/260P ULTRASIV®-250/250P ULTRASIV®-240/240P ULTRASIV®-230/230P ULTRASIV®-220/220P	US-280 highest activity, US-220 lowest activity, all grades available with CO promotion version designated by the letter "P" following the number.	Gas oils, Gas oil-resid mixtures, resids	Incremental resid processing catalyst, Vanadium tolerance, low coke, low gas, attrition resistance.	Microsph.	1.1 g/cc	In-situ sillica/ alumina	Zeolite, moderate rare earth, moderate surface area	✓
HEZ-55™ / EPZ®-55 HEZ-54™ / EPZ®-54 HEZ-53™ / EPZ®-53 HEZ-52™ / EPZ®-52 HEZ-50™ / EPZ®-50	HEZ-55 highest activity, HFZ-50 lowest activity EPZ designates CO promoted versions	Gas oils, high nitrogen gas oils, California gas oils	Bottoms upgrading catalyst, octane barrels and cetane	Microsph.	1.0 g/cc	"	Zeolite, moderate rare earth, high surface area	✓
MAGNASIV®-380/380P MAGNASIV®-370/370P MAGNASIV®-360/360P	MAG-380 highest activity, MAG-360 lowest activity Letter "P" designates CO promoted versions	Gas oils, Gas oil-resid mixtures resids-High nitrogen gas oils. California gas oils, coker gas oils	Low coke and gas yields, metal tolerance of ULTRASIV-plus bottoms upgrading and nitrogen tolerance of HEZ series	Microsph.	1.05 g/cc	"	Zeolite, high rare earth, moderate surface area	✓
OCTISIV®-PLUS/P OCTASIV®-130/130P OCTASIV®-120/120P	OS-Plus highest activity, stability & metals tolerance. OS-130 intermediate activity/stability. OS-120 lowest activity. Letter "P" designates Co promoted versions	Gas oils, Gas oil-resid mixtures, resids	Selective octane catalysts for high octane without gasoline penalty. OS-Plus formulated for resid applications.	Microsph.	1.1 g/c	In-situ Silica/ alumina	Zeolite low, no rare earth. Moderate surface area	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
ULTRASIV®-450/450P ULTRASIV®-440/440P ULTRASIV®-430/430P	US-450 Highest activity, US-430 lowest activity Letter "P" designates CO promoted versions	"	US 200 series liquid selectivity with different physical & chemical properties for circulation sensitive units. Reduced CO_2-CO ratio for partial oxidation units. Reduced H_2 yields, lower coke than US-200 series.	Microsph	1.0 g/cc	In-situ Silica/ Alumina	Zeolite, high rare earth. Low surface area	✓
ULTRASOX™/-P	Available in a variety of cracking & sulfur reduction activities to match unit objectives. Letter "P" designates CO promoted versions.	High sulfur gas oils, gas oil-resid mixtures	SOx reduction together with cat. features of ULTRASIV series.	Microsph.	1.1 g/cc	In-situ Silica/ Alumina	Zeolite/Proprietary SOx reduction features	✓
HFZ®-33/33P HFZ®-20/20P HFZ®-23/23P HFZ®-25/25P	HFZ-33 highest activity, HFZ-25 lowest activity Letter "P" designates CO promoted versions	Gas oils	Olefins for chemical feedstocks, high oc-tane/cetane	Microsph.	1.0 g/cc	In-situ silica/ alumina	Zeolite. No rare earth. High surface area	✓
Ultradyne® 980/ 980P, 970/970P, 960, 950, 940, 930	UD980 is highest activity/P for CO promoted grade	Gas oil	Low coke production, low gasoline bromine number, high gasoline yield, low dry gas yield	Microsph	1.0	In situ silica/ alumina	Zeolite	✓
Dynacat® 1080/P, 1070, 1060, 1050, 1040, 1030	DC 1080 is highest activity/P for CO promoted grade	Resid, high metals gas oil	High activity maintenance under metal contaminated situations (same selectivity as above)	"	"	"	"	✓
Dynasiv® 780/P, 770, 760, 750, 740, 730	DS 780 is highest activity/P for CO promoted grade	Gas oil/ mild resid	Moderate octane, good bottoms upgrading, high gasoline selectivity	"	"	"	"	✓
Dynasiv Plus® 880/P, cement, 870, 860, 850, 840, 830	DSP880 is highest activity/P for CO promoted grade	Gas oil/ resid	Octane enhancement regen. temp. reduction, good gasoline selectivity, good bottoms upgrading	"	"	"	Ultrastabilized zeolite	✓
Octidyne® 1170/P, 1160, 1150, 1140, 1130	OP1170 is highest activity/P for CO promoted grade	Gas oil/ resid	Maximum octane production, maximum cetane, good gasoline selectivity, reduced regenerator temp	"	"	"	"	✓
Ultrasox® 1280/P	USX-1280 highest activity for CO promoted grade. All have substantial SOx reducing capacity	Gas oil/ resid	Maximum SOx reduction capability built into a single catalyst, good gasoline selectivity and bottoms upgrading	"	"	"	Zeolite	✓
DynaSox® 1380/P, 1340, 1370, 1360, 1350 1330	DSX 1380 is highest activity/P for CO promoted grade	Gas oil/ resid	Moderate SOx reduction built into single catalyst Good gasoline selection and bottomsupgrading	" "	" "	In situ "	Zeolite "	✓ "
Nitrodyne® 1490	ND1490 extremely high activity FCC catalyst	High N feeds, coker gas oils	High in-unit activity, excellent conversion, bottoms upgrading					
HARSHAW FILTROL								
FGO-1 FGO-2 FGO-3	General purpose, three activity levels—"3" highest	Gas oils or high metals resid (blending catalyst)	All-around balance	Microsph.	0.80 g/cc (ABD)	Active alumina	Rare-earth exchanged y-faujasite	✓
OCTEX-1 OCTEX-2 OCTEX-3	High octane gasoline. Three activity levels—"3" highest	Gas oils or light resid	High gasoline yields & O.N. low coke, high LCO cetane No.	"	"	"	"	✓
ROC-1 ROC-25 ROC-50	Resists metals. Low coke make, Highest Activity. Three activity levels.	Heavy gas oil, high metals resids. High temp. Transfer line cracking	High gasoline yield & O.N. low coke & D.O., high cetane	"	"	"	"	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
HMT FSS-1 FSS-2	Rugged, all purpose. Three activity levels—"2" highest	Unusually severe steaming or temp. condition, nitrogen resistant	High gasoline yield & O.N., low coke	"	"	"	"	✓
SOC-1 SOC-2	Resist metals, rugged. Two activity levels—"2" highest	HGO, high metals resid, severe conditions	High gasoline yield & O.N., low coke, high cetane	"	"	"	"	✓
MOC-1 MOC-2	Resist metals, low coke, rugged. Two activity levels—"2" highest	HGO, high metals resids. Severe deactivating conditions	High gasoline, O.N. High LCO cetane, low coke and D.O.	"	"	"	"	✓
OC	Octane-type catalyst, low cost/limited production	Gas oils through light resids	High gasoline yield & O.N., low coke & D.O.	"	"	"	"	✓
DOC-1	Diesel oil production	Gas oils resids.	High LCO yield with high cetane	"	"	"	"	✓
FOCUS	High octane gasoline, low gas and coke make, wide applicability, has ultrastable Y zeolite	Gas oils through resids, outstanding low gas yield	Extra yield of highest ON gasoline, minimize gas, decanted oil yields	Microsph.	0.80 g/cc (ABD)			Low rare earth in ultrastable Y-Faujasite
FSS-Y	Rugged, all purpose including high metals and ultra high regen. temp. applications, has ultrastable Y zeolite	Heavy gas oils through high metals resids, resists vanadium poisoning	High octane gasoline with standing yields	"	"			High rare earth, ultrastable Y-Faujasite
ZSM-5	Octane enhancing additive	Broad applicability, largest gain on paraffinic type feeds	Octane improvement, particularly in presence of extra alky plant capacity	"	"			Licensed, shape selective zeolite
KATALISTIKS, INC.								
Delta-400	Maximum research and motor octane without yield penalty	Gas oil, resid, reduced crude	High liquid, maximum mid-barrel yield. Low 650+ yield.	Microsph.	0.74 g/cc (ABD)	Silica Alumina	USY Zeolite & low surface area matrix	
Delta-300	"	"	", and coke yields	"	0.76 g/cc (ABD)	"	"	
Sigma-200 Plus	Excellent for max-distillate operation	"	High liquid, maximum mid-barrel yield. Low 650+ yield and low gas attrition resistance	"	0.76 g/cc (ABD)	"	High silica, low rare earth zeolite and matrix.	
Sigma-300 Plus	Flexible for max-distillate or max gasoline operation	"	"	"	0.75 g/cc (ABD)	"	"	
Sigma-400 Plus	Maximum octane bbls.	"	"	"	0.74 g/cc (ABD)	"	"	
Sigma-600 Plus	Maximum octane bbls. and esp. for high severity operations	"	"	"	0.72 g/cc (ABD)	"	"	
BMZ-200	Max distillate yield	Gas oil, resid, reduced crude, high nitrogen, coker gas oil	High liquid, maximum mid-barrel yield. Low 650+ yield and low gas. Attrition resistance. Low bromine number. High isobutane yield.	Microsph.	0.76 g/cc (ABD)	Silica Alumina	High silica, fully rare earth exchanged zeolites & low surface area matrix.	
BMZ-300	Flexible for max distillate or max gasoline	"	"	"	0.75 g/cc (ABD)	"	"	
BMZ-400	Maximum gasoline yields for severe operations	"	"	"	0.74 g/cc (ABD)	"		
BMZ-600	Maximum metals tolerance and hydrothermal stability	"	"	"	0.72 g/cc (ABD)	"	"	
Sigma-200	General purpose, low activity	"	", balanced butane yields	"	0.76 g/cc (ABD)	"	Mixed prem. quality zeolite & low surface area matrix	
Sigma-300	General purpose, intermediate activity	"	"	"	0.75 g/cc (ABD)	"	"	

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
Sigma-400	General purpose, high stability	Gas oil, resid, reduced crude, high nitrogen coker and gas oil	High liquid, maximum mid-barrel yield. Low 650+ yield and low gas. Attrition resistance. Low bromine number. Balanced butane yields.	Microsph.	0.74 g/cc (ABD)	Silica/Alumina	Mixed prem. quality zeolite & low surface area matrix	
Sigma-600	General purpose, highest activity & stability	"	"	"	0.72 g/cc (ABD)	"	"	
EKZ-2	General purpose, low activity	Gas, dirty feeds, coker gas oils	High liquid yield, low gas and coke	"	0.79 g/cc (ABD)	"	Fully REO exchanged zeolite	
EKZ-3	General purpose mod. activity	"	"	"	0.78 g/cc (ABD)	"	"	
EKZ-4	General purpose, high activity	"	"	"	0.76 g/cc (ABD)	"	"	
Ekonokat-1	General purpose, and activity, excellent for metals control	"	High liquid yield, low gas and coke and low 650+ yield.	"	0.76 g/cc (ABD)	"	Mixed zeolite and low surface area matrix	
Ekonokat-2	General purpose, mid-range activity, excellent for metals control	Gas oil, dirty feeds, coker gas oils	High liquid yield, low gas and coke and low 650+ yield	Microsph.	0.72 g/cc (ABD)	Silica/Alumina	Mixed zeolite and low surface area matrix	
KX-100	Maximum vanadium tolerance	Resids	High liquid yields, low coke and gas yields	"	0.76 g/cc (ABD)	"P"	"P"	
KX-431	Maximum octane bbl	Gas oils, resids, reduced crudes	High liquid, mid-bbl yields. Low gas, coke and 650+ yields.	"	0.74 g/cc (ABD)	Silica/Alumina	High silica, low rare earth zeolite and matrix	
KX-419	Maximum research and motor octane	"	"	"	0.74 g/cc (ABD)	"	High silica zeolite & matrix	
W. R. GRACE CATALYSTS PTY. LTD.								
LA 65	Low alumina, matrix cracking, low activity	Gas oil cracking	Transport fuels	Microsph.	0.47 g/cc (ABD)	Silica-alumina	Silica-alumina	✓
HA 65	High alumina, matrix cracking, low activity	Gas oil cracking	"	"	0.49 g/cc (ABD)	"	Silica-alumina	✓
HAY 5	High alumina matrix and zeolite cracking	Gas oil cracking	"	"	0.49 g/cc (ABD)	"	Silica-alumina + zeolite	✓
HAY 10	More conversion than HAY 5. Greater activity and increased selectivity	Gas oil cracking	"	"	0.50 g/cc (ABD)	"	Silica-alumina + zeolite	✓
HAY 15	More conversion than HAY 10.	Gas oil cracking	"	"	0.50 g/cc (ABD)	"	Silica-alumina + zeolite	✓
HAY 20	More conversion than HAY 15.	Gas oil cracking	"	"	0.50 g/cc (ABD)	"	Silica-alumina + zeolite	✓
Other, CP-3, Additve R	(See Davison Chemical Division, W. R. Grace & Co. listing)							

Hydrocracking

AKZO CHEMIE/AKZO CHEMIE AMERICA/KETJEN CATALYSTS								
Ketjenfine LC-fining	(See Lummus Crest "Hydrocracking" listing)							
AMERICAN CYANAMID CO.								
IPB-2		AGO & VGO	Gasoline & distillates	Cyl.		"P"	"P"	Licensees of Shell Oil Hydrocracking Process
HC-102	(See Unocal "Hydrocracking" listing)							Licensees of Unocal's Unicracking process
MD-2	(See British Petroleu. Listing)							Licensees of BP Hydrocracking Process
HDS-1442B	Ebullating bed catalyst	Resid hydrotreating		Cyl.	~34	Alumina	C_0O MoO_3	Licensees of H-Oil and LC-Fining processes
HDS-1443B	"	"		"	~36	"	NiO/MoO_3	"
GHC	(See Gulf Research "Hydrocracking" listing)							H-G or Gulf Hydrocracking process licensees
DHC	"							"
ARCO PETROLEUM PRODUCTS CO.								
ARCO H-H Cat		Raw lube stocks	High quality lube products	Cyl.	48			Licensees of Arco H-H Lube Oil Process
BP								
MD-2		VGO	High selectivity for middle distillates	Cyl.		"P"	"P"	Licensees of BP Hydrocracking Process

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
BASF AG								
M 8-80	Raffination and hydrocracking	HGO,VGO	Middle distillate, steamcracker feed	Cyl. extr	Approx. 0.70 kg/l	Amorph. alumina-silicates	NiO MoO_3	BASF licensees
M 8-81	Hydrocracking	"	"	"	Approx. 0.68 kg/l	"	"	"
M 8-85	"	"	middle distillate, steamcracker feed, kerosene	"	approx. 0.72 kg/l	zeolite	"	"
M 0-80	"	"	naphtha	"	approx. 0.60 kg/l	"	Pd	"
CHEVRON RESEARCH CO.								
ICR 106	High hydrodenitrogenation activity, high cracking activity	VGO, CGO, LCO, AGO	Diesel, jet, naphtha, Isocracker second stage feed	Cyl.	63	"P"	"P"	Licensees Chevron Isocracking Process
ICR 120	Max. diesel yield	"	"	Cyl.	63	"P"	"P"	"
ICR 126	Longer life	"	"	Cyl.	58	"P"	"P"	"
ICR 113	Lower cost	" + Deasphalted oil	"	Cyl.	48	"P"	"P"	"
ICR 117	Naphtha yield	VGO, CGO, LCO, AGO	Naphtha, jet, diesel, Isocracker second stage feed	Cyl.	58	"P"	"P"	"
ICR 202	High activity and selectivity	Hydrofined VGO, CGO, and LCO	Reformer feed, light naphtha, jet fuel, isobutane	Cyl.	61	"P"	"P"	Licensees Chevron Isocracking Process
ICR 204	Long cycle life	"	"	Cyl.	52	"P"	"P"	"
GULF RESEARCH & DEVELOPMENT CO.								
GHC	Maximum gasoline oriented hydrocracking	Distillates and light gas oils	Gasoline, naphtha, kerosene and jet fuel	Cyl.	50-60	Silica Alumina	"P"	H-G or Gulf Hydrocracking Process licensees through Gulf approved vendor
DHC	Maximum distillate oriented hydrocracking	Distillates and light and heavy vacuum gas oils	Furnace oil, diesel, jet fuel and kerosene	Cyl.	50-60	Silica Alumina	"P"	H-G or Gulf Hydrocracking Process licensees through Gulf approved vendor
KATALCO CORP.								
KAT-4000	Active metal	Atm. & Vac. residua		Cyl.	34	Alumina	Cobalt/molybdenum	✓
KAT-5000	Active metal	"		Cyl.	34	"	Nickel/molybdenum	✓
LUMMUS CREST INC.								
LC-Fining	Accommodates heavy feeds, high tolerance for metals loading	Atm. bottoms, vacuum bottoms, heavy crudes, tars shale, coal liquids, deasphalter pitch	Produces distillates, low sulfur fuel	Cyl. exts.	Relatively low	Alumina	CoMo or NiMo	Sale to LC-Fining licensees by American Cyanamid, Ketjen & Davison Chemical
SHELL CHEMICAL								
S 324	Dentrification and single stage hydrocracking.	Coal oil hydrocracking and single stage hydrocracking		Ext.	0.86 g/cc	Alumina	Ni/Mo/P	✓
S 324T	"	"		Trilobe®	0.80 g/cc	"	"	"
S 327	High desulphurization enhanced resistance against metals	Pretreatment of cat cracker feed		Ext.	0.80 g/cc	Alumina	Ni/Mo/P	✓
S 653	Second stage hydrocracking	VGO to naphtha and middle distillates		Ext.	"	Silica/alumina	Ni/W	✓
S-753	"	"		"	0.70 kg/l	Crystalline silica/alumina		
S 354	Hydrocracking of heavy distillates			Ext.	1.02 g/cc	Alumina	Ni/W/P	✓
S 454	Hydrocracking of heavy distillates			Ext.	1.05 g/cc	Alumina	Ni/W	✓
UOP INC.								
DHC-2	Bifunctional catalyst, very strong hydrogenation function, good cracking activity	VGO, DAO, CGO other non-straight run gas oils	High selectivity to middle distillates	Sph	41	Amorphous	"P"	
DHC-6	Bifunctional catalyst, good hydrogenation function, very good cracking activity	"	"	Sph	44	Amorphous	"P"	

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
DHC-8	Bifunctional catalyst, good hydrogenation function, very good cracking activity, improved temperature stability	"	"	Sph.	44	Amorphous	"P"	
HC-8	Second stage high activity cracking catalyst. Very active and stable	"	High selectivity to naphtha	Cyl.	42	Zeolite	"P"	
HC-100	Second stage high activity cracking catalyst. Much more active than HC-8	"	"	"	48	Zeolite	"P"	
HC-101	High activity cracking catalyst. Srtong hydrogenation function	Naphtha "	High selectivity to LPG	"	50	Zeolite	"P"	
RCM-3	High activity catalyst approved for use in ebullating bed resid conversion units, high strength spheres	Vacuum residua	Naphtha, distillates, and gas oils	Sph.	41	"P"	"P"	
RCM-4	"	"	"	Sph.	39	"P"	"P"	
UNION CARBIDE CORP.								
HC-14	(See Unocal's "Hydrocracking catalysts")							
HC-16	"							
HC-18	"							
HC-22	"							
HC-28								
HC-30	"							
UNOCAL CORP.								
HC-14	Flexibility for gasoline, naphtha, kerosene, jet fuel, or diesel production	Virgin cracked distillates, VGO	Gasoline, kerosene, jet fuel and/or diesel fuel	Cyl.	"P"	Contains molecular sieve	Nonnoble metals	Uniracking proess licensees
HC-16	Flexibility for kerosene, jet fuel, or diesel production	"	Kerosene, jet fuel, and/or diesel fuel	Cyl.	"P"	"	"	"
HC-18	Maximum production of LPG, gasoiine, or naphtha	"	LPG, gasoline, and/or petrochemical naphtha	Cyl.	"P"	"	Noble metals	"
HC-22	Maximum production of diesel fuel or jet fuel	"	Diesel fuel and/or jet fuel	Cyl.	"P"	"	Nonnoble metals	"
HC-28	Maximum production of LPG, gasoline, and/or petrochemical naphtha	"	LPG, Gasoline, and/or petrochemical naphtha	Cyl.	"P"	"	Noble metal	"
HC-30	Selective hydrocracking for pour point reduction	Petroleum and shale oil fractions	Low pour point distillates, lube stocks, and/or syncrudes	Cyl.	"P"	"	Nonnoble metal	"
HC-102	Maximum production of diesel fuel	Virgin and cracked distillates, VGO	Diesel fuel	Shaped Ext.	"P"	Amorphous	Nonnoble metal	"
PROCATALYSE								
HYL 544		Gas oil, vacuum gas oil	Gasoline, distillates	Cyl.		Al_2O_3 SiO_2	Ni/Mo	✓

Mild hydrocracking

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
AKZO CHEMIE/AKZO CHEMIE AMERICA/KETJEN CATALYSTS								
KF-1001	Cobalt moly.	Convert VGO feeds	Distillate boiling range material	Cyl.	46	Alumina		
KF-1002	Nickel moly.	"	"	Cyl.	48	Alumina		
KF-1010/1011	Nickel moly.	"	"	Cyl.	48	Alumina		
AMERICAN CYANAMID CO.								
HCM-40	(See Unocal listing)						"P"	Unocal licensees
HCM-110	"						"P"	"
BASF AG								
M 8-80	Raffination and mild hydrocracking	HGO,VGO	Middle distillate	Cyc. extr.	Approx. 0.70 kg/l	Amorph. alumina-silicates	NiO MoO_3	BASF licensees
M 8-81	Mild hydrocracking, combination with M 8-14	"	"	"	Approx. 0.68 kg/l	"	"	"
BP								
MH 128	middle distillates	VGO	High selectivity to	Shaped ext	45	"P"	"P"	✓
CATALYST & CHEMICALS INDUSTRIES CO., LTD.								
HT-D3	High middle distillate yield	VGO	Kerosene, diesel oil & desulfurized VGO	Cyl.	0.71 g/ml	Alumina		✓
CDS-D13	Middle distillate yield	VGO	Kerosene, diesel oil & disulfurized oil	Cyl.	0.78 g/cc	Alumina		

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
CHEVRON RESEARCH CO.								
ICR 106	High cracking activity, selective for mid-dist. production	VGO, CGO, LCO, AGO	Diesel, FCC feed LSFO	Cyl	63	"P"	"P"	Licensees Chevron Mild Isocracking Process
ICR 126	Longer life, higher conversion levels	"	Diesel, naphtha, FCC feed, LSFO	Cyl	58	"P"	"P"	"
ICR 114	Lower cost	"	Diesel, FCC feed, LSFO	"P"	57	"P"	"P"	"
EXXON RESEARCH & ENGINEERING CO.								
RT-2 RT-228 RT-621	See also ER&E "Hydrorefining"							ER&E process license through certified vendor
RT-3 RTNX-1	High activity, regenerability	Virgin/cracked VGO's	FCC feed prep, naphtha and Mid-dist. prod'n	—	—	"	Cobalt, Nickel & Moly	"
HALDOR TOPSOE								
TK-551	High stability	VGO range	Middle distillate plus treated VGO	Cyl	46	Alumina	Ni Mo	✓
TK-581	"	"	"	—	46	"	"	"
HARSHAW/FILTROL								
Filtrol HPC-50	High activity for nitrogen removal and polynuclear aromatics saturation, high sulfur removal activity	HVGO, VGO	FCC feed	Kloverleaf* ext. (4-lobed)	51	Alumina	Nickel oxide (5.0%) Molybdic oxide (20.0%)	✓
KATALCO CORP.								
477	% of active metals	FCC feed, gas oil blends		Cyl	45	Alumina	Cobalt/Moly	✓
477S				Sph	36			
479				Cyl	51			
497	"	"		Katform	45	"	"	"
499S	"	"		"	51	"	"	"
482	Active metal	Sour gases and light hydrocarbon stocks		Cylinder	32	"	"	"
483	"	Refinery feedstocks		Cyl	35	Alumina	Cobalt/Moly	
484				Cyl	42			
NM 502	"	FCC feed, gas oil blends, hydrocracker feedstock, cycle oils, [illegible]er distillates	FCC feed, hydrocracker feed	Cyl	45	Alumina	Nickel/Moly	
NM 502S				Sph	36			
NM 504K				Cyl	52			
NM 506				Cyl	57			
592	% of active metals, shape	"	"	Katform	45	"	"	"
594		"	"	"	52	"	"	"
596		"	"	"	57	"	"	"
PROCATALYSE								
HTH 544	Good stability, high middle distillate selectivity	HVGO		Cyl		Silica alumina	Nickel & Moly	✓
SHELL CHEMICAL								
MHC-1	Combined conversion and desulphurization activity	VGOs	Middle distillates plus treated VGO	Ext	0.86 g/cc	Alumina	Ni/Mo/P	✓
MHC-200	Low pressure MHC catalyst	VGO's		Ext	0.76	Alumina	Co/Mo	
UNOCAL CORP.								
HCM-40	High stability catalyst for mild hydrocracking	Virgin and cracked distillates and VGO	Distillates plus hydrotreated feedstock	Shaped ext	"P"	"P"	"P"	Unocal Licensees
HCM-110	High stability catalyst for mild hydrocracking	"	"	Shaped ext	"P"	"P"	"P"	Unocal Licensees
UNITED CATALYSTS INC.								
C20-7-02	Composition & physical properties	Lube oil & HVGO	Hydrogenation of olefins & cracked product	Exts	44	Al_2O_3	Ni Mo	✓
C20-7-02CDS	"	"	"	"	"	"	"	✓
C20-7-04	"	"	"	"	50	"	"	✓
C20-7-06CDS	"	"	"	Ext	44	"	"	✓
UOP INC.								
DHC-2	Bifunctional catalyst, clean-clean-up and hydrogenation function, good cracking activity	VGO, CGO	Distillate production, desulfurization, lube base stocks	Sph	41	"P"	"P"	
MHC-10	Bifunctional catalyst, high hydrogenation and cracking activity	"	"	Cyl	41	"P"	"P"	

OGJ international refining-catalyst compilation—continued

Hydrotreating/hydrogenation, saturation catalysts

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
AIR PRODUCTS & CHEMICALS INC.								
HR 836	Pretreat catalyst	Pyrolysis gasoline	Saturated hydrocarbons	Cyl.		Alumina	Co/Mo	Licensees of PYROTOL® process
AKZO CHEMIE/AKZO CHEMIE AMERICA/KETJEN CATALYSTS								
Active supports	Used to support catalyst bed and for feed distribution in top of reactor. Relatively low activity reduces coking and pressure drop and saturation of diolefins in cracked feedstocks.							
A-500	Nickel moly.			Cyl.	42	Alumina		
A-501	Cobalt moly.			Cyl.	42	Alumina		
NiMo 5B	Nickel moly.			Sph.		Alumina		
CoMo 5B	Cobalt moly.			Sph.		Alumina		
KFH-oil	Cobalt moly.	Resid		Cyl. ext.				
KFH-oil	Nickel moly.	Resid		"				
KFSC 1315	Shell Oil catalyst							
KF 1535/153	Nickel moly.	SR & cracked naphthas, distillates, VGO, LCO, lube oil & refined lube oil		Cyl.	48	Alumina		
KF 842	Nickel moly.	SR, cracked naphtha		Asym. Quadri-lobe (AQ)	51	Alumina		
KF 840	Nickel moly. high activity	SR & cracked naphthas, distillates, VGO		AQ	47	ALumina		
KF 643/644	Nickel moly.	Hydrometallation		AQ	45	Alumina		
KF 330	Nickel moly.	High pressure lube oil saturation and diolefin saturation		Cyl.	52	Alumina		
KF 124 LD	Cobalt moly.	St. Run Naphtha		Cyl.	38	Alumina		
KF 124 HD	Cobalt moly.	Naphtha, kerosene, gas oil, VGO lube oil		Cyl.	48	Alumina		
KF 165	Cobalt moly.	SR & cracked naphthas, distillates, VGO, LCO, lube oil & refined lube oil		Cyl.	48	Alumina		
KF 640	Cobalt moly. high activity	Naphtha, kerosene, gasoil vacuum gasoil		Asym. Quadrilobe (AQ)	41	Alumina		
KF 742	Cobalt moly. high activity	SR & cracked naphtha, distillates, and VGO; lube oil, rerefined lube oil & pyrolysis naphtha			46	Alumina		
KF 702	Cobalt moly. high activity	SR & cracked naphtha, distillates and VGO; LCO		Cyl. ext.		Alumina		
AMERICAN CYANAMID CO.								
HDS-2(1.6) HDS-2(3.2)	Different particle sizes	Naphthas through LGO		Cyl.	36	Alumina	CoO/MoO$_3$	✓
HDS-3(1.6) HDS-3(3.2) TRILOBE® HDS-3(1.6) TRILOBE® HDS-3(3.2)	Different particle size & shapes	Naphthas through LGO		Cyl. or shaped ext.	44-47	Alumina	NiO/MoO$_3$	✓
HDS-9(1.6) HDS-9(3.2) TRILOBE®	Different particle size & shapes	Naphthas through heavy gas		Cyl. or shaped ext.	49-52	Alumina	NiO/MoO$_3$	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
HDS-9(1.6) TRILOBE® HDS-9(3.2)		oils						
TRILOBE® HDS-20(1.6) TRILOBE® HDS-20(3.2)	Different particle sizes	Naphthas through HGO		Shaped ext.	~ 46	Alumina	CoO/MoO$_3$	✓
TRILOBE® HDN-30(1.6) TRILOBE® HDN-30(3.2)	Different particle sizes	Naphthas through HGO		Shaped ext.	~ 52	Alumina	NiO/MoO$_3$	✓
TRILOBE® HDS-35(1.6) TRILOBE® HDS-35(3.2)	Different particle sizes	Naphthas through LGO		Shaped ext.	~ 46	Alumina	NiO/CoO/MoO$_3$	✓
AS-100	(See Unocal "Hydrotreating") listing							Licensees of Unocal's Unisar Process
TRILOBE® HDN-60(1.6) TRILOBE® HDN-60(3.2)	Different particle sizes	Naphthas through HGO		Shaped ext.	~ 53	Alumina	NiO/MoO$_3$	✓
RT-3	(See Exxon R&E "Hydrotreating Catalysts" listing)							Licensees of ER&E Gofining Process
DHT ~~catalyst~~	(See Gulf Research Listing)							Gulf Licensees
IMP-DSD-3	(See Instituto Mexicano del Petroleo Listing)							Licensees of IMP
Trilobe® HDS-24 (1.6)	Different particle sizes	Naphthas thru HGO		Shaped ext.	~ 35	Alumina	CoO/MoO$_3$	✓
HDS-24 (3.2)	"	"		"	"	"	"	"
BASF AG								
M 8-14		LPG, natural gas, all SR fractions, and blends with cracked oils, pyrolysis gasoline	Steam reforming feed, catalytic reformer feed jet fuel, diesel feed for aromatic extraction plant	Cyl. ext.	Ca. 650 g/l	$\gamma-Al_2O_3$	Ca. CoO 4 wt% MoO$_3$ 15.5 wt%	✓
M 8-14 Star shaped	More active for heavy fractions.	HGO, VGO, SR, and blends, with cracked oils, paraffins, lube oils	Jet fuel, diesel gas oil, HC feedstocks, tech. white lube oil	Star shaped exts.	Ca. 600 g/l	$\gamma-Al_2O_3$	"	✓
M 8-24 Cyl.		Blends of SR fractions with cracked oils	Catalytic reformer feed	Cyl. ext.	Ca. 700 g/l	$\gamma-Al_2O_3$	Ca. NiO 4 wt%, MoO$_3$ 16 wt%	✓
M 8-24 Star shaped	More active for heavy fractions	Blend of HGO, or VGO with cracked oils, lube oil	Gas oil, FCC feed, lube oil	Star shaped exts.	Ca. 650 g/l	$\gamma-Al_2O_3$	"	✓
M 8-25	Unsaturated compounds	Raffination and dearomatisation	Lube oil, paraffin wax	Cyl. extr.	Approx 0.85 kg/l	$\gamma-Al_2O_3$	NiO 5 wt%/ MoO$_3$ 19 wt%	✓
H 0-11		Selective hydrogenation of acetylene in ethylene	Ethylene	"	Approx. 0.46 kg/l	Silica	Pd	✓
H 0-12		Selective hydrogenation of acetylenes in C_3- and C_4-streams		Cyl. ext.	Approx. 1.1 kg/l	Alumina	Pd	✓
H 0-22		Selective hydrogenation of diolefines & unsaturated aromatics	Pyrolysis gasoline	Cyl. ext./sph.	0. 65 kg/l/0.80 kg/l	Alumina	Palladium	✓
H 1-80		Hydrogenation of aromatics	Food grade white oil	Cyl. extr.	1.0 kg/l	Silicate carrier	Ni	BASF Licensees
EXXON RESEARCH & ENGINEERING CO.								
RT-3 RT-NX-1	High activity, excellent regenerability	Virgin/cracked VGO's and distillates	Feed prep. for cat. reforming & FCC; S and N removal, etc.	—	—	—	Cobalt, nickel & Molybdenum	ER&E process license through certified vendors.
ENGELHARD CORP.								
HPN®-IVB	Selectively hydrogenates trace butadiene and isomerizes butene-1 to butene-2	C_3-C_5 stream	Alkylation plant feedstock	"P"	"P"	"P"	"P"	HPN-IVB process licensees
GULF RESEARCH & DEVELOPMENT & CO.								
DHT-I	High activity hydrogenation	Distillates and LGO, HGO	High quality distillate fuels (incl. diesel)	Cyl	60-70	Alumina	"P"	Gulf Dist. Hydrotreating Process licensee through Gulf approved vendor
DHT-II	Moderate activity hydrogenation	Naphtha, kerosene, distillates, cycle oils	Naphtha, kerosene, distillates	Cyl	40-50	Alumina	"P"	Gulf Naphfining, Gulfining, & Cycle Oil Hydrogenation Process licensee through Gulf approved vendor

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
DHT-III	Improved version of DHT-II (desulfurization service)	Same as DHT-II plus HVGO	Naphtha, kerosene, diesel, distillates, FCCU feed	Cyl. Sph.	40-48 32-38	Alumina	"P"	Same as DHT-II plus HGO Gulfining
AR-I	Selective arsine removal catalyst	Light HC gas feedstocks for ethylene manufacture	Arsine-free feedstocks	Cylinder	34-35	Alumina	"P"	Lummus Arsine Removal Process licensee through Gulf approved vendor
HALDOR TOPSOE								
TK-230/231		Natural gas, refinery gases SR naphtha	Deep HDS for steam reforming and cat. reforming. HDS and olefin saturation of refinery gases	Cyl.	48	Al_2O_3	Co,Mo(230) Ni,Mo (231)	✓
TK-250/251	Ring-shaped	"	"	Ring	32	"	Co,Mo 250/ Ni,Mo 251	✓
TK-551		SR & cracked naphthas distillates to HAGO range	Deep HDS, HDN and aromatics saturation.	Ring cyl.	46	"	Ni,Mo	✓
TK-550	Lower selectivity for HDN and aromatics saturation than TK-551 and therefore lower H_2 consumption	"	Deep HDS	Ring Cyl.	46	"	Co,Mo	✓
HARSHAW/FILTROL								
Filtrol 107	High S removal combined with high HDM and low pressure drop. Resistance to coking.	Atm. & Vac. resid	FCC feed, fuel oil	Klover-™ leaf extrudate cyl.	38-39 (loading density)	Alumina	Nickel oxide 4%, Molybdic oxide 12%, Titanium oxide 8%	✓
Filtrol 102	same as 107, but smaller size							
Filtrol 106	High pressure demetalization combined with high S removal and low pressure drop. usually for front end applications (with GC-107 or GC-102 used in the back end)	"	"	Klover-™ leaf extrudate	37-38 (loading density)	Alumina	Cobalt oxide 1.5%, Nickel oxide 0.8%, Molybdic oxide 12%	✓
AVR-A, AVR-B, AVR-C, AVR-D	See Gulf R&D "Hydrorefining"							✓
Filtrol HPC-60	Highest activity for sulfur removal	High sulfur HGO, heating oil, naphtha	Gas oil, heating oil range, gasoline component	Klover-™ leaf extrudate	46	Alumina	Cobalt oxide 5.0%, molybdic oxide 16.0%	✓
Filtrol HPC-66	Slightly lower activity than HPC-60	"	"	Klover-™ leaf extrudate,	44	Alumina	Cobalt oxide 4.0%, molybdic oxide 15.0%	✓
Filtrol HPC-50	Highest activity for nitrogen and poly nuclear aromatics removal, high activity for S removal.	VGO, HVGO, LCO, CGO, coker distillates & naphtha, lube stocks	FCC feed, lube gasoline component, jet fuel	Klover-™ leaf extrudate,	51	Alumina	Nickel oxide, 5.0%, molybdic oxide 20.0%	✓
Filtrol HPC-40B	Same functions as HPC-50 but lower activity.	Preceeding & cracked naphtha, distillates	FCC feed, gasoline & diesel components	Klover-™ leaf extrudate,	47	Alumina	Nickel oxide 4.0%, molybdic oxide 15.0%	✓
CoMo-0402T		Desulfurization of hydrocarbons		Cyl. tablet	60	Silica Alumina	Cobalt moly.	✓
CoMo-0603T		Desulfurization of hydrocarbons		Cyl. tablet	64	Alumina	Cobalt moly.	✓
HT-400E	Highly active for desulfurization, denitrogenation	Heating oil & HVGO		Cyl. ext.	50	Alumina	Cobalt moly.	✓
HT-500E	Highly active for denitrogenation, desulfurization and polyaromatic saturation	Naphtha pretreating, AGO, LCO, HVGO	"	Cyl. ext.	50	Alumina	Nickel moly.	✓
INSTITUTO MEXICANO DEL PETROLERO								
IMP-DSD-3	High activity trilobe catalyst	Wide range of petroleum fractions	Naphtha for reforming, high diesel activity FCC feed	Cyl. Trilobe*	0.74 g/cc	γ-Al_2O_3	Mo, Ni, P	IMP Licensees
IMP-DSD-4	High activity sphere catalyst	"	"	Sph.	0.55 g/cc	γ-Al_2O_3	Mo, Ni	"

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
IMP-DSD-5	Good activity sphere catalyst for HDS	Gasolines to diesel	Naphtha for reforming good quality diesel	Sph	0.55 g/cc	γ-Al_2O_3	Mo, Ni, P	✓
IMP-DSD-1	Good activity sphere catalyst for hydrodesulfuration	"	"	Sph	0.86 g/cc	γ-Al_2O_3	Mo, Ni	✓
KATALCO CORP.								
477* 477S* 479*	% of active metals, shape	SR naphtha through gas oil resid blends		Cyl Sph Cyl	46 36 52	Alumina	Cobalt moly	✓
497 499S	" "	" "		Katform "	45 51	"	"	"
482	Active metal	Sour gases and light hydrocarbon		Cylinder	32	"	"	"
483 484	% of active metals	SR naphtha through gas oil resid blends		Cyl Cyl	35 42	Alumina	Cobalt moly	✓
NM 502* NM 502S* NM 504K* NM 506*	% of active metals, shape	SR naphtha through gas oil resid blends		Cyl Sphere Cyl Cyl	46 36 56 58	Alumina	Nickel moly	✓
592 594 596	" " "	" " "		Katform Katform Katform	45 52 57	" " "	" " "	" " "
482 NM 503	Active metal	Sour gases, light hydrocarbon stocks		Cyl Cyl	32 32	Alumina	Cobalt moly Nickel moly	✓
NT 550 NT 550S	Shape	Cracked stocks, cycle oil, jet fuel, lubes		Cyl Sph	50 37	Alumina	Nickel Tungsten	✓
DM 500	Demetallization	Heavy stocks, resids		Sph	23	Alumina	Nickel moly	✓
* Company also lists as mild hydrocracking catalyst.								
PROCATALYSE								
LD 271	Selective hydrogenation of propylene rich cut from steam cracking, also butene-1 rich cut	Steam cracker propylene rich, butene-1 rich cut	Propylene, Butene 1	Sph		Al_2O_3	Pd promoter	✓
LD 275	Selective hydrogenation of pyrolysis gasoline fractions	Pyrolysis gasoline	Gasoline	"		Al_2O_3	Pd promoter	✓
LD 277	Acetylene removal from Butadiene rich steam cracker cut	C_4 steam cracker cut	Butadiene rich C_4 cut	"		Al_2O_3	Pd promoter	✓
LD 2773	Selective hydrogenation of butadiene in butene rich cuts from FCC	FCC C_4 cut	C_4 cut	"		Al_2O_3	Pd promoter	✓
LD 277	MAPD removal from FCC propylene cuts	FCC C_3 cut	C_3 cut	"		Al_2O_3	Pd promoter	✓
Ni PS_2	Total hydrogenation of benzene into cyclohexane	Benzene	Cyclohexane	Powder		Ni	Ni	✓
LT 261	Selective hydrogenation of ethylene (acetylene removal)	Ethylene cut (vapor phase)	Ethylene	Sph		Al_2O_3	Pd	
LD 145	Selective hydrogenation of pyrolysis gasoline and 180-400 °C. fraction	Pyrolysis gasoline	Gasoline	"		Al_2O_3	Ni Mo	
LD 155	Selective hydrogenation of pyrolysis gasoline and 180-400 °C. fraction	Pyrolysis gasoline heavy gasoline	Gasoline, special fuel	"		Al_2O_3	Ni W	
LD 241	Selective hydrogenation of pyrolysis gasoline	Pyrolysis gasoline	Sweet gasoline	"		Al_2O_3	Ni	
LD 265	Selective hydrogenation of pyrolysis propylene cut, butylene cut, and gasoline	Pyrolysis propylene cut, butylene cut, gasoline	Propylene, butylene, gasoline	"		Al_2O_3	Pd	
HC 102	Total hydrogenation	Benzene	Cyclohexane	liquid			Ni	✓
Cu 640	Hydrogenation	Aldehydes	Alcohols	Cyl.		SiO_2	Cu	✓
Ni 563	Hydrogenation	Aldehydes, unsaturated hydrocarbons	Alcohols, solvents	Pellets		SiO_2	Ni	✓
SHELL CHEMICAL								
S 214	Multi purpose hydrotreating	Naphtha to HVGOs		Exts	0.66 kg/l	Alumina	Ni Mo P	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
S 324	High performance desulphurization, denitrogenation.	Coker naphtha and pyrolysis gasoline to HVGOs		*	0.86 kg/l	Alumina	Ni/Mo/P	✓
S 324T	"	"		Trilobes	0.80 kg/l	"	"	
S 424	High activity desulfurization, denitrogenation and saturation	Pretreatment of cracker feed, first stage hydrocracking	*	Trilobes*	0.82	Alumina	Ni/Mo/P	✓
S 327	Resistance to poisoning by metals.	Pretreatment of cracker feed and heavy oil fractions contaminated with metals.		*	0.80 kg/l	Alumina	Ni/Mo/P	✓
S 514	Support Function-replaces inert ceramic material.	All HDT applications-preferentially cracked feedstocks.		Sph.	0.80 kg/l	Alumina	Ni/Mo	✓
S 244	High efficiency desulphurization.	Naphtha and fuel oils.		Exts.	0.65 kg/l	Alumina	Co/Mo/P	✓
S 344	Heavy duty desulphurization	Wide variety of stocks including HVGO		*	0.78 kg/l	Alumina	Co/Mo/P	✓
S 344T	"	"		Trilobes*	0.73 kg/l	"	"	
S 434	High efficiency desulphurization	Naphtha and gas oil		Ext.	0.65	Alumina	Co/Mo	✓
S 444	High activity desulphurization	VGO, LGO, HGO, Cracked gas oils		*	0.77	Alumina	Co/Mo	✓
S 444T	"	"		Trilobes*	0.72 kg/l	"	"	
S 447	Deep desulfurization	VGO, residue, LGO, HGO		Trilobes*	0.71	Alumina	Co/Mo	✓
S 544	Support function. Can replace all ceramic material.			Sph.	0.80 kg/l	Alumina	Co/Mo	✓
S 127	Initial residue desulphurization	Heavy residues with moderate metal content.		Ext.	0.70 kg/l	Alumina	Ni/Mo	✓
S 227	Tail end deep residue desulphurization	Heavy residues with moderate metal content.		*	0.70 kg/l	Alumina	Ni/Mo	✓
S 147	Initial residue desulphurization	Heavy residues with moderate metal content.		*	0.70 kg/l	Alumina	Co/Mo	✓
S 247	Tail end deep residue desulphurization	Heavy residues with moderate metal content.		*	0.70 kg/l	Alumina	Co/Mo	✓
S 311	Hydrocracker tail end catalyst	Hydrocracked feed		Ext.	0.76	"	Ni/Mo	
S 614	Hydrogenation of aromatics	Kerosene and specialty oils		*	0.41 kg/l	Silica/ Alumina	Pt	✓
S 204	Hydrogenation of di-olefins	Pyrolysis gasoline		*	0.72 kg/l	Alumina	Ni	✓
S 504	Hydrogenation of di-olefins	Pyrolysis gasoline	Support balls, replaces inert ceramic material	Sph.	0.80 kg/l	Alumina	Ni	✓
UNOCAL CORP.								
HC-B, HD-D, HC-F, HC-H, HC-K	(See "Hydrorefining catalysts")							
AS-100	Saturation of aromatics	Naphtha, kerosene, jet fuel	Low aromatics naphthas, high smoke point kerosene and jet fuel	Extruded Cyl.	"P"	"P"	Noble Metal	Unisar Process licensees
N-21, N-22, N-23, N-30, N-100	(See "Hydrorefining catalysts")							
UNITED CATALYSTS INC.								
C20-5-01		Coker naphtha, SR naphtha, kerosene, diesel	HDS, removal of metal contaminants such as As, Pb, Ni, V, improves color odor, stability	Tablet or extrusion	50	Al_2O_3	Co/Mo	✓
C20-6-01	Composition, physical properties	Light naphthas through heavy residues	HDS hydrogenation of olefins	Extrusion 1/8-in. or 1/16-in.	38	Al_2O_3	Co/Mo	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
C20-6-03	"	"	"	"	44	"	"	✓
C20-6-04	"	"	"	"	51	"	"	✓
C20-7-02	Composition physical properties	Cracked stocks and high olefin and nitrogen content feedstocks	HDS, HDN, hydrogenation of olefins, de-wax	"	44	"	Ni/Mo	✓
C20-7-03	"	"	"	"	38	"	"	✓
C20-7-04	Composition physical properties	Cracked stock, high olefin and nitrogen content feedstocks	HDS, HDN, hydrogenation of olefins, de-wax	Extrusion	50	Al_2O_3	Ni/Mo	✓
C20-6-04 CDS	High desulfurization activity	VGO, LGO, HGO		Ext.	37-43	Al_2O_3	CoMo	✓
C20-7-07 CDS	High desulfurization, denitrification activity	Pretreatment of FCC feed	FCC feed	Ext.	47-53	Al_2O_3	NiMo	✓
G-87	Total hydrogenation of Benzene to Cyclohexane	Benzene	Cyclohexane	Sph.	52-58		Ni	✓
G-98B	"	Bz with sulfur present	"	Tab	48-52	Silica	NiCuCo	✓
C46-7-03	High hydrogenation activity	Saturation of aromatics		Ext.	40-48	Silica	Ni	✓
C46-8-03	"	"		Ext.	40-48	Al_2O_3	Ni	✓
G-68A	Hydrogenation of C_5 dienes	Isoprene		Tab	32-38	Al_2O_3	Pd	✓
G-68C	Selective hydrogenation, DPG-diolefins	Pyrolysis gasoline	Gasoline	Sph.	42-48	Al_2O_3	Pd	✓
G-68D	Selectivity hydrogenates trace butadiene & isomerize B1 to B2	C_3 - C_5 stream	Alkylation feedstock	Tab	64-69	Al_2O_3	Pd	✓
C38-1	Selective hydrogenation, trace butadiene with isomerization	C_3 - C_5 stream with sulfur present	"	Ext.	52-58	Al_2O_3	Ni	✓
C20-7-06CDS	"	"	"	Extrusion	44	"	Ni/Mo	✓
UOP INC.								
S-12	High desulfurization and denitrifaction activity.	Naphtha through VGO, cracked stocks, high severity operation	Desulfurization, denitrification	Cyl.	49	Alumina	Cobalt Molybdenum	
S-16	Moderate dentrification and desulfurization activity.	Naphtha through VGO, cracked Stocks. Moderate to high Severity Operation	"	Cyl.	50	Alumina	Nickel, Molybdenum	
S-9	Moderate desulfurization and dentrification activity.	Naphtha through AGO. Moderate severity operation.	"	Sph.	39	Alumina	Cobalt, Molybednum	
PF-4	Selective hydrogenation catalyst	Alphmethylstyrene in Cumene. Diolefin Saturation	Cumene, pyrolysis Gasoline	Sph.	32	Alumina	Palladium	
H-3	High hydrogenation activity, sulfur tolerant	Saturation of aromatics (usually benzene)	High-purity cycloparaffins (usually cyclohex ane)	Sph. Sphere	32	Alumina	Platinum	
H-4	High hydrogenation activity	" plus selective diolefin sat., methanation	"plus upgrade alky unit feed"		Sph.	39	Alumina	Nickel
H-8	High hydrogenation activity	Saturation of aromatics in distillate fuels. Saturation of residual aromatics in n-Paraffin streams	Improved burning or ignition qualities. High purity N-Paraffins	Sph.	32	Alumina	Platinum	

Hydrorefining

AKZO CHEMIE/AKZO CHEMIE AMERICA/KETJEN CATALYSTS	
HCK	(See Unocal "Hydrorefining" listing)
RT-2, RT-3, RT-621, RT-228, RT-NX7	See ER&R "Hydrorefining" listing

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
AMERICAN CYANAMID CO.								
HC-B, HC-D, TRILOBE* HC-F, TRILOBE* HC-H	(See Unocal "Hydrorefining catalysts" listing)			Cyl. or shaped extrudate				Licensees of Unocal's Unicracking Process
TRILOBE* RF-11, TRILOBE* RF-25	(See Unocal "Hydrorefining catalysts" listing)			Shaped extrudate				Licensees of Unocal's Unicracking-HDS Process
RT-2	(See Exxon R&E "Hydrorefining catalysts" listing)							Licensees of Exxon's Residfining Process
RT-3	(See Exxon R&E Listing)							Licensees of Exxon's Go-fining process
CSM-471		Resid hydrotreating		Shaped ext	"P"	"P"	"P"	Licensees of Campagnie Francaise de Raffinage
HDS-1442A HDS-1442B	Different particle sizes	Resid or VGO hydrotreating		Cyl	~ 34	Alumina	CoO/MoO$_3$	✓
HDS-1443-A HDS-1443-B	Different particle sizes	Resid or VGO hydrotreating		Cyl	~ 36	Alumina	NiO, MoO$_3$	✓
HDS-9(1.6) HDS-9(3.2) TRILOBE* HDS-9(1.6) TRILOBE* HDS-9(3.2)	Different particle sizes and shapes	HGO/cat. feed hydrotreating	Fuel oil/FCC feed	Cyl. or shaped extrudate	.49-52	Alumina	NiO/MoO$_3$	✓
TRILOBE* HDS-20(1.6) TRILOBE* HDS-20(3.2)	Different particle sizes	"	Fuel oil/FCCU feed	Shaped extrudate	~ 46	Alumina	CoO/MoO$_3$	✓
TRILOBE* HDN-30(1.6) TRILOBE* HDN-30(3.2)	"	"	Fuel oil/FCCU feed	Shaped extrudate	~ 52	Alumina	NiO/MoO$_3$	✓
A/VRA-F	(See Gulf "Hydrorefining listing")							Licensees Gulf HDS
TRILOBE* HDN-60(1.6) HDN-60(3.2)	Different particle sizes	HGO/cat. feed hydrotreating	Fuel oil/FCCU feed	Shaped extrudate	~ 53	Alumina	NiO/MoO$_3$	✓
LF-I, LHT-II, LHT-I, LHT-II, LHT-III	(See Gulf R&D "Hydrorefining listing")							Gulf R&D licensees
N-21, N-22, N-23, N-24, N-30	(See Unocal "Hydrorefining" listing)							Licensees of Unocal Unionfining process
BASF AG								
M 8-21		Raw lube oil feedstocks	lube oil, white oil	Cyl. ext.	Ca. 720 g/l	Alumina	Ni/Mo	
CATALYST & CHEMICALS INDUSTRIES CO., LTD.								
CDS-R2	High HDS activity at low reaction temperature.	Atm. & vac. resid	Desulfurized oil	Cyl	0.68 g/ml	Alumina	—	✓
CDS-R9	High HDS & demetalization activity	Atm. & vac. resid	Desulfurized oil	Cyl	0.66 g/ml	Alumina	—	✓
CDS-DM-1	High dematalization activity	"	Demetalized oil	Cyl.	0.58 g/ml	"	—	✓
CDS-DM5	High demetalization activity with desulfurization ability	"	"	"	0.62 g/ml	"		
CDS-D5	High HDS activity	Naphtha & kerosene	Desulfurized naphtha & kerosene	Cyl.	0.68 g/ml	—	—	✓
CDS-D9	High HDS activity	Naphtha, kerosene, naphtha, gas oil	Desulfurized Kerosene, gas oil	"	0.72	Alumina		
CDS-D11	High HDS activity	Kerosene, diesel & VGO	Desulfurized, kerosene, diesel & VGO	Cyl	0.73 g/ml	—	—	✓
CDS-D13	Superior high HDS activity	"	"	"	0.78	"		
CDS-DN1	High HDS and HDN activity	Naphtha	Desulfurized Naphtha	"	0.77	"		
CDS-DR1	High HDS activity	20-30% Atm. resid and 80-70% VGO (mixture)	FCC feed, desulfurized oil	"	0.70	"		
CHEVRON RESEARCH CO.								
ICR 112	High HDS activity, low H_2 consumption	VGO, CGO	LSFO, FCC feed	Cyl	53	"P"	"P"	Licensees Chevron Hydrotreating Process

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
ICR 114	High HDN activity	VGO, CGO	FCC feed	"P"	57	"P"	"P"	✓
ICR 105	Designed for resid hydrotreating	DAO, topped crudes, atm resids, vac resids	LSFO, FCC feed, coker feed	Cyl	49	"P"	"P"	✓
ICR 121	Resid feeds	″	″	"P"	43	"P"	"P"	✓
ICR 122	Resid HDM	″	LSFO, FCC feed, resid desulfurization feed, coker feed	"P"	30	"P"	"P"	✓
ICR 124	Resid HDM	″	″	"P"	30	"P"	"P"	✓
EXXON RESEARCH & ENGINEERING CO.								
RT-2 RT-228 RT-621	Contaminant tolerant catalyst for resid processing	Atmos. resids, vac. resids	Feed prep for FCC and coking, LSFO & Lt distillates	—	—	Tailored pore size supports	Co/Mo & Ni/Mo	ER&E process licensee through certified vendors
RT-3, RT-NX-1	High activity, Regenerability	Virgin cracked VGO's and distillates	Feed prep. for cat. reforming & FCC, S and N removal, etc.	—	—	—	Co/Ni/Mo	✓
GULF RESEARCH & DEVELOPMENT CO.								
A/VR-A	High metals resistance Resid HDS catalyst	Up to 75% desulfurization of atm. & vac. residuals	0.5-1.0% sulfur content HFO	Cyl	32-40	Alumina	"P"	Gulf resid HDS Process licensee through Gulf qualified vendor
A/VR-B	Reduced ΔP-comparable in activity to A/VR-A	″	″	Multi-lobe shape	30-38	Alumina	"P"	✓
A/VR-C	High coke deactivation resistant Resid HDS catalyst. Good metals retention	75-93% desulfurization of atm. & vac resids	0.2-0.6% sulfur content HFO, resid FCC feedstock preparation	Multi-lobe shape	33-41	Alumina	"P"	✓
A/VR-D	Reduced ΔP-comparable in act. to A/VR-C	″	″	Multi-lobe shape	33-41	Alumina	"P"	✓
A/VR-E	High severity desulf. service Resid HDS catalyst (regenerable)	>93% desulfurization of atm. & vac residuals	0.05-0.2% sulfur content HFO	Cyl	33-42	Alumina	"P"	✓
A/VR-F	Reduced ΔP-comparable in activity to A/VR-E	″	″	Multi-lobe shape	31-40	Alumina	"P"	✓
A/VR-G	Alternate metals formulation of A/VR-A	Up to 75% desulfurization of atm. & vac. residuals	0.5-1.0% sulfur content resid fuel oils	Cyl	34-40	Alumina	"P"	✓
A/VR-H	Reduced ΔP-comparable in activity to A/VR-G	″	″	Multi-lobe shape	32-38	Alumina	"P"	✓
A/VR-I	Superior metals resistance, comparable HDS activity improvement to A/VR-A,B	High metals content atm. & vac. resids	Upfront demet. HDS catalyst for high demetallization services	Multi-lobe shape	30-37	Alumina	"P"	✓
LF-I	1st generation lube finishing catalyst	Conventional refined or virgin lube feedstocks	Automotive & industrial lube and base oils	Cyl	40-50	Alumina	"P"	Gulf Gulfinishing Process licensee through Gulf approved vendor
LF-II	High activity, hydrogenation, selective hydrocracking	″	″	Cyl., sphere	40-48 (c) 32-38 (s)	Alumina	"P"	✓
LHT-I	High activity hydrogenation, selective hydrocracking	Poor quality lube feedstocks	″	Cyl	50-55	Silica alumina	"P"	Gulf Lube Hydrotreating Process licensee through Gulf approved vendor
LHT-II	Higher activity	″	″	Cyl	50-60	Silica alumina	"P"	✓
LHT-III	Selective hydrogenation, saturation catalyst	Semi-refined lube or specialty oil product feedstocks	Lubricants, industrial oils & specialty products	Cyl	60-70	Alumina	"P"	Gulf Lube Hydrotreating & Specialty Oil Hydrogenation Process licensees
HALDOR TOPSOE								
TK-550	Smaller pore catalyst for lighter feeds	AGO, VGO	HDS	Ring/Cyl	37-46	Al_2O_3	Co, Mo	✓
TK-551	″	VGO, FCC feedstocks, CGO	HDS, HDN, PNA removal	Ring, Cyl	37 46	″	Ni/Mo	✓
TK-581	Larger pore catalyst for heavier feeds	″	″	Ring, cyl	37 46	″	Ni/Mo	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refine[illegible] unrestricted sa[illegible] except wh[illegible] noted
TK-709	Low HDS activity, high HDM selectivity, high metals capacity	Atm resid, vac. resid, DAO	Front end catalyst in HDS, HDM service	Ring, cyl.	25 33	Al_2O_3	Mo	"
TK-710/711	Slightly higher HDS activity than TK-709, high HDM selectivity, high metals capacity	"	"	Ring, cyl.	31 40	" "	Co,Mo (710) Ni, Mo (711)	"
TK-750/751	Medium HDS activity, HDM selectivity and tolerance for metals deposition	"	Intermediate catalyst in HDS, HDM service	Ring, cyl.	31 40	" "	Co, Mo (750) Ni, Mo (751)	"
TK-770/771	High HDS activity, low HDM selectivity and limited tolerance for metals deposition.	"	Final catalyst in HDS, HDM service	Cyl.	45	" "	Co, Mo (770) Ni, Mo (771)	"
INSTITUTO MEXICANO DEL PETROLEO								
IMP-HDW-10	Zeolitic based catalyst used for dewaxing lube oil cuts	Wide range of lube oils	Dewaxed lubestock	Cyl	0.80 g/cc	Zeolite Al_2O_3	Pt/Zeolite	IMP licensees
KATALCO CORP.								
477, 477S, 479, 497, 499	(See also Katalco Corp. "Mild hydrocracking")							
483, 484	"							
502, 504, 506, 592, 594, 596	"							
UNOCAL CORP.								
N-30	High activity, desulfurization	Virgin & cracked distillates, naphthas, & VGOs	Desulfurized products	Shaped extrudate	"P"	"P"	Co, Mo	Unionfining Process licensees
N-100	"	"	"	Extruded Cyl.	"P"	"P"	Co, Mo	"
N-23	"	"	"	Extruded Cyl.	"P"	"P"	Co, Mo	"
N-22	Desulfurization & denitrogenation	"	Low sulfur, low nitrogen products	Extruded Cyl.	"P"	"P"	Ni, Mo	"
N-21	"	"	"	Extruded Cyl.	"P"	"P"	Ni, Mo	"
HC-H	Desulfurization and Denitrogenation	Virgin & cracked distillates & VGOs	Hydrocracker & cat cracker feeds	Shaped extrudate	"P"	"P"	Ni, Mo	Unicracking and VGO Unionfining process licensees
HC-K	"	"	"	Shaped extrudate	"P"	"P"	Ni, Mo	"
HC-F	"	"	Distillate products, hydrocracker and cat cracker feedstocks	Shaped extrudate	"P"	"P"	Ni, Mo	"
HC-D	"	"	"	Extruded Cyl.	"P"	"P"	Ni, Mo	"
HC-B	"	"	"	Extruded Cyl.	"P"	"P"	Ni, Mo	"
RF-11	Desulfurization catalyst	Atm. residua, whole crudes	Fuel oil, cat cracking, coker feed	Shaped extrudate	"P"	"P"	"P"	Unicracking/HDS Process licensees
RF-25	High activity bifunctional catalyst for demetallization	"	"	"	"P"	"P"	"P"	"
RF-100	Desulfurization catalyst	"	"	"	"P"	"P"	"P"	"
RF-200	High activity bifunctional catalyst for demetallization	"	"	"	"P"	"P"	"P"	"
RF-220	"	"	"	"	"P"	"P"	"P"	"
UOP INC.								
RCD-5	Metals tolerance and HDS activity	Atm. or vac. residua	LSFO, feedstock for cracking units & cokers	Sph	41	Alumina	Co/Mo	
RCD-5A	High activity for HDS, moderate metals tolerance	"	"	Sph.	46	Alumina	Co/Mo	
RCD-7	High activity for Sulfur and Con. Carbon Removal	Dematallized oil, deasphalted residua	LSFO & Feed for cracking units	Cyl	53	Alumina	Co/Mo	
RCD-8	High metals tolerance, high demetallization activity, moderate HDS activity	Atm. or vac. residua, & deasphalted residua	LSFO & feeds for cracking units & cokers	Cyl	36	"P"	"P"	
PROCATALYSE								
HR 306	HDS, HDN	Naphtha through VGO		Cyl		Al_2O_3	Co/Mo	"
HT 308	HDT	Residues		"	0.57 g/cc	"	Co/Mo	"
HR 346	HDS, HDN, hydrogenation	"		Cyl		Al_2O_3	Ni/Mo	"

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
HR 348	HDS, HDN, hydrogenation of aromatics	Naphtha through VGO	Desulfurized nitrogen free, hydrogenated product, example - FCC feed preparation	Cyl.	0.77 g/cc	Al_2O_3	Ni Mo	✓
HR 354	"	"		Cyl.		Al_2O_3	W/Ni	✓
HMC 841	HDT, HDM	GO, VGO, Atm. resid./vac resid.		sph.		Al_2O_3	Ni MO	✓
HMC 849	HDM	GO, VGO, atm. resid./vac. resid.		Sph.		Al_2O_3	Ni Mo	✓
HMC 845	HDT, HDM	GO, VGO, atm. resid./vac resid.		Sph.		Al_2O_3	Ni Mo	✓
Actispheres 923	Catalyst protection and support	Naphtha through atm. resid		Sph.		Al_2O_3	Ni/Co/Mo	✓

Polymerization

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
INSTITUTO MEXICANO DEL PETROLERO								
IMP-TPC-1	High selective extrudate catalyst	Propylene	Propylene tetramer, high octane gasoline	Cyl.	0.88 g/cc	Kieselgurgh	H_3PO_4	IMP licensees
UNITED CATALYSTS INC.								
C84-1-01 & C-84-02-04	Particle size	Propylene, benzene Propylene &/or butenes Propylene	Cumene Polygasoline Higher olefins	Sph.	55	Diatomaceous earth	Phosphoric acid	✓
C84-3-01 & C84-3-02	Form, particle size	"	"	Extrusion	"	"	"	✓
UOP INC.								
SPA-1	High activity & selectivity; large size for chamber reactor	Propylene, butenes, pentenes, benzene, toluene	Petrochemicals, gasoline, tetramer, cumene, cymene	Cyl.	58	Silica	Phosphoric acid	Contact UOP
SPA-2	Small size for tubular reactor	"	"	Cyl.	58	Silica	Phosphoric acid	Contact UOP
SPA-4	High temp. aromatic operations	Ethylene, benzene	Ethylbenzene	Cyl.	61	Silica	Phosphoric acid	Contact UOP

Sulfur (elemental) recovery

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
ALCOA								
S-100 1/4-in	Lower pressure drop	Refinery heavy hydrocarbons in Claus feedstock	Withstands coking and ammonia. All converters and subdewpoint tail-gas processes.	Sph.	46	—	None	✓
S-100 3/16-in.	Higher activity	Refinery or natural gas	All converters and subdewpoint tail-gas processes	"	46	—	None	✓
S-100 5/16-in.	Extremely low pressure drop		Withstands extreme coking and ammonia. All converters but primarily first converter	Sph	46		None	
SRU 1/2-in.	Active bed support	All Claus plants	All Claus plants	"	50	—	None	✓
SRU 3/8-in.	"	"	All Claus plants	"	50	—	None	✓
SP-100 1/4-in.	Promoted, lower pressure drop	COS and CS_2 conversion	COS and CS_2 conversion	"	48	S-100 1/4-in.	"P"	✓
SP-100 3/16-in.	Promoted	COS and CS_2 conversion	COS and CS_2 conversion	"	48	S-100 3/16-in.	"P"	✓
ARI TECHNOLOGIES								
ARI-310	Active ingredient in chelated aqueous solution	Refinery gas, sour water stripper gas, amine tail gas, natural gas	Elemental sulfur	Liquid	74.8	None	Iron	Lo-Cat process licensees
CATALYST & CHEMICALS INDUSTRIES CO. LTD.								
CSR-2	High Claus activity	Claus reaction feed gas.	Sulfur	Sph.	0.84 g/ml	Alumina	—	✓
CSR-3	High hydrolysis of organic sulfide	"	"	"	0.87 g/ml			
CSR-7	High prevention of sulfation	"	Sulfur	Sph.	0.80 g/ml	Alumina	—	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
ENGELHARD CORP.								
SRC 2-4	High Claus activity	Gas containing 2:1 H_2S/SO_2	Purified gas and sulfur	Granules	53	Alumina	Alumina titania iron oxide	✓
SRC-4-8	Higher than SRC 2-4 activity	Gas containing 2:1 H_2S/SO_2	"	Granules	55	Alumina	"	✓
LPD 5-6	Modest activity. Bed support or topping	Gas containing 2:1 H_2S/SO_2	"	Extrudate	52	Alumina	"	✓
LPD 5-8	Modest activity, bed support only		"	Extrudate	52	Alumina	"	✓
KAISER CHEMICALS								
S-201 3 x 6, 1/2 x 1/4	Standard high porosity alumina Claus	H_2S and SO_2 conversion Moderate COS and CS_2 conversion	Sulfur production	Sph.	45	Activated alumina	Activated alumina	✓
S-501 3 x 6, 1/2 x 1/4	Promoted alumina Claus sulfur recovery catalyst. Sulfation resistant.	High activity catalyst for improved COS and CS_2 conversion	"	Sph	52	Activated alumina	"P"	✓
S-701	" plus thermal stability	Very high CS_2 and COS conversion and H_2S conversion	"	Klover-leaf* extrudate	52	"P"	"P"	✓
RHONE POULENC								
CR 4-6	High pore volume alumina	H_2S	Sulfur	Sph	0.67 g/ml	Alumina		✓
DR 5-10	First generation Claus catalyst.	"	"	"	0.75 g/ml	Alumina		✓
AM 4-6	Catalysts sulfation protection	"	"	"	0.75 g/ml	Alumina	Fe	✓
CRS 21	High COS & CS_2 conversion	"	"	"	0.71 g/ml	Alumina	TiO_2	✓
CRS 31	High COS and CS_2 conversion. Unsulfatable catalyst	"	"	Ext. cyl	0.95 g/ml	Titanium oxide	TiO_2	✓
CT 739	Catalytic incineration	H_2S & SO_2	SO_2	Sph	0.60 g/ml	Silica	Fe	✓
SHELL CHEMICAL								
S 949	High activity Claus catalyst with high COS and CS_2 hydrolysis		Sulfur	Sph	0.53 g/ml	Silica		✓
UNOCAL CORP.								
Selectox-32	Solid catalyst for oxidation of H_2S to sulfur	Acid gas from refineries, natural gas plants, or waste treatment plants	Sulfur, no SO_2	Cyl. Ext.	"P"	"P"	Non-noble metals	Selectox process licensees
Selectox-33	"	"	"		"			

Steam hydrocarbon reforming catalysts

BASF AG								
M 8-12	Hydrogenation of organic sulfur compounds	Natural & refinery gas, LPG & lt naphtha	Steam reformer feedstock	Extrudates	0.72 kg/l	Alumina	Co/Mo	✓
M 8-21	"	" (with high CO_2 content)	"	"	0.72 kg/l	Alumina	Ni/Mo	✓
R 5-10	Removal of H_2S	Sulfur containing gases	"		1.4 kg/l		Zinc oxide	✓
G 1-25	Steam reforming (gasification)	Natural & refinery gas	Process gas for CO-shift conversion	Rings	1.1-1.25 kg/l	Alumina	Ni	✓
G 1-25 S	"	"	"	Rings	0.9 kg/l	Alumina (high thermostability)	Ni	✓
G 1-50	"	LPG/naphtha	"	Rings	1.1 kg/l		Nickel alkalized on a special carrier	✓
G 1-80	Autothermal steam reforming	Naphtha/LPG	Process gas for tubular reformer	Tablets	"P"	"P"	Nickel	Licensee: BASF/LURGI Richgas-Process
K 6-10	High temp. shift conversion (HTS)	Process gas ex steam reforming/partial oxidation	Process gas for H_2 production	Tablets	1.0 kg/l		Iron oxide/chromium oxide	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
K 8-11	Shift conversion of sulfur containing gases	Process gas ex partial oxidation	—	Extrudates	"P"	"P"	Co/Mo	✓
K 3-110	Low temp. shift conversion (LTS)	Process gas ex HTS	—	Tablets	"P"	ZnO Al_2O_3	Cu	✓
R 1-10	Methanation	Methanation of CO_2 & CO	H_2	Tablets	0.9 kg/l	Alumina	Nickel	✓
DYCAT INTERNATIONAL								
Dycat 873	High activity steam reforming catalyst	Natural gas LPG, refinery off-gas, to light naphtha		Rings	68-70	Alpha alumina	Ni, La	✓
Dycat 873F	"	"		Enhanced surface area, fluted ring	64-66		"	"
Dycat 804	High temperature methanation	Process gas		Rings, cylinders	54-56			
Dycat 704	Methanation	"		Cylinders, spheres	58-62	Refractory	Ni	"
HALDER TOPSOE								
RKS-1	Medium active steam reforming catalyst	Lt. to hvy. NG and ref. off gas	H_2, CO, CO_2	Rings	62-65	$MgAl_2O_4$	Ni	✓
R-67	High active steam reforming catalyst	C_1-C_4 hycarbon, ref offgas	—		65-68			✓
R-67-7H				Cyl. penetrated by 7 holes	53-56			✓
RKNR	—	Methane, LPG, naphtha, reforming off-gas	—	Rings	57-60	MgO, Al_2O_3		Licensees
HTZ-3	Fine desulphurization of steam reforming feed stocks	Methane, LPG, naphtha ref offgas	S free hydrocarbon	Extrusion	78	—	ZnO	✓
SK-12	High temperature CO conversion	Steam reforming effluent	Gas with 2-3% CO	Cyl	65	—	Oxides of iron & chromium	✓
LSK	Low temp. CO conversion, regenerable, Cl_2 resistant	HT-shift effluent	Gas with 0.1-0.3% CO	Cyl	66	—	Oxides of copper-zinc & chromium	✓
LK-801	Low temperature CO conversion, sulfur resistant	HT-shift effluent	Gas with 0.1-0.3% CO	Cyl	67	—	Oxides of copper, zinc & aluminum	✓
PK-5	Methanation	H_2 with up to 2% (CO + CO_2)	H_2 without O_2 containing contaminants	Ext. rings	39	Alumina	Nickel	✓
KATALCO CORP.								
23-1	Steam reforming	Natural gas/refinery gas		Ring	66/75	Alumina	Ni	✓
23-3	"	"		Ring	66/75	Alumina	Ni	✓
25-3	"	Hvy natural gas		Ring	66	Ca Aluminate	Ni/Potash	✓
46-9	"	" & LPGs		Ring	66	Ca Aluminate	Ni/Potash	✓
46-1	"	Naphtha		Ring	72		Ni/Potash	✓
46-4	"	Naphtha		Ring	62		Ni	✓
71-1	High temp. shift	Reformer product gas		Cyl	77	None	Iron/Chrome oxides	✓
52-1	Low temp. shift	HT shift product gas		Cyl	62	None	Copper/Zinc/Alumina	✓
52-2	"	"		Cyl	62	None	"	✓
11-3	Methanation	CO_2 removal plant gas		Cyl	70	Ca Aluminate	Ni	✓
11-4	"	as above		Cyl	75	Ca Aluminate	Ni	✓
59-3	Chloride removal	Any gas stream		Sphere	55	Alumina	Activated alumina	✓
32-4	Sulfur removal	"			77	None	Zinc oxide	✓
UNITED CATALYSTS INC.								
C11-2 and C11-2S	Steam hydrocarbon reforming	Natural gas through propane feeds	H_2, 65-72%	Raschig rings	50-55*	Calcium Aluminate	Ni	✓
C11-9-01, 02, 03, 04, 06	Composition differs	"	"	Raschig rings	70-95*	Refractory Alumina	Ni	✓
C11-9-09 HGS	"	"	"	High geometric surface area 7-spoke short "wheels"	70	—	Ni	✓
G90A, & B, & C	"	"	"	Raschig rings	50-60*	"	Ni	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
G56A, B, H	"	"	"	Raschig rings	55-60	Calcium Aluminate	Ni	✓
C11-9-061	Composition differs	Butane through naphtha feeds	H_2, 65-72%	Raschig rings	80-85*	Refractory Alumina	Ni	✓
C11-9-062	"	"	"	Raschig or HGSA	80-85 70 (HGS)	"	Ni	✓
C11-N/C11-NK (split loading)	"	Butane through naphtha	"	Raschig ring	67	Refractory	Ni	✓
* Bulk density depends on size of rings and Ni content.								
C7-2 C7-4	Desulfurization, differ in metal content	NG steam reformer feeds	Sulfur free streams	Ext	70 80	Binder	ZnO	✓
G-72D	"	"	"	"	70	—	—	✓
G-1	Conversion of S compounds to H_2S absorption of H_2S	NG streams	"	Tablets	"P"	"P"	"P"	✓
C12-3-05	High temperature shift conversion	Process gas ex reformers	CO free gas	Tablets	65	—	Fe Cr	✓
G3	"	"	"	—	70	—	Fe Cr	✓
C18 HC	Low temperature shift conversion	Process gas	"	Tablets	80-85	—	Cu	✓
C18-HCS	Low temperature shift conversion	"	"	"	70-80		Cu	✓
G66A	"	"	"	Tablets	80	—	Cu (available pre-reduced and stabilized)	✓
G66B	"	"	"	Tablets	90 85	—	—	✓
C13-3 C13-4 C13-5	Methanation, (differ in form & metal content)	Process gas	Hydrogen without CO and CO_2	Tab Sph	65 55 60	Refractory	Ni	✓
C25-2-02	Co/H_2O shift H_2S containing gas	", partial oxidation		- ext. or tabs	40-47	Al_2O_3	Co Moly	
G65	"	"	"	Tab	Tablets 65(T)	—		
G65RS	(withstands elevated temperatures)			Ext	58(ex) 60(T)		(available pre-reduced and stabilized)	
G87 G87RS	Methanation	"	"	Ext Sph	60 (ex) 55 (S)	—	—	
PROCATALYSE								
MT 15	CO Methanation		Pure H_2	Spheres		Alumina	Ni	✓

Sweetening catalysts

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
INSTITUTO MEXICANA DEL PETROLEO								
IMP OM-1	Sweetening in homogenous phase	LPG, gasoline		Powder	—	—	Cobalt	IMP licensees
IMP-OM-2	Sweetening in heterogenous phase	Gasoline, turbofuel kerosene		Powder	—	—	Cobalt	
UOP INC.								
MEROX FB®	Active agent dispersed in water. For MEROX® fixed-bed sweetening process	Lt. nap. to diesel fractions		Liquid slurry		—	"P"	MEROX Process Licensees
MEROX WS®	Active agent dissolved in water. For MEROX® liquid-liquid sweetening process	C_3 through LSR & thermal gasolines		Liquid solution			"P"	MEROX Process licensees
MEROX No. 10®	Active agent supported on activated carbon base.	Lt. nap through diesel fractions		Granular		Activated carbon	"P"	MEROX process licensees
MEROX NO. 8®	"	" Light naphthas through diesel fractions		Granular		Activated carbon	"P"	MEROX process licensees
ARI TECHNOLOGIES								
ARI-100, ARI 100 W.S.	Powder (WS in water soluble bags)	LPG and gasoline	Merox® Process Mericat® Process, Liquid liquid contactor	Powder		None	"P"	✓
ARI-100L		"	"	Liquid suspension		None	"P"	✓
ARI-100XSL		"	"	Liquid		None	"P"	✓
ARI-120		LPG, gasoline, kero, jet fuel	Merox® Process, fixed bed reactor	Powder		None		✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
ARI-120L				Liquid slurry		None		✓

Claus Unit tail gas treatment catalysts

AKZO CHEMIE/AKZO CHEMIE AMERICA/KETJEN CATALYSTS								
KF-124 LD	Co/Mo			Cyl	38	Alumina		
KF-124 HD	Co/Mo			Cyl	48	Alumina		
KF 165	Co/Mo			Cyl	48	Alumina		
ALCOA								
S-100 1/8-in.	Subdewpoint Claus tail-gas processes			Sph	46	—	None	✓
AMERICAN CYANAMID CO.								
N-25, N-39	(See Unocal "Claus Unit tail gas listing")							
HDS-2		Tail gas		Cyl	36	Alumina	CoO/MoO$_3$	✓
Selectox-33	(See Unocal listing)						licensees	Unocal
ARI TECHNOLOGIES								
ARI-310	Active ingredient in chelated aqueous solution	Claus tail gas, amine acid gas	Elemental sulfur	Liquid	74.8	None	Iron	Lo-Cat* process licensees
KAISER CHEMICALS								
S-201 3 × 6 5 × 8	Standard high porosity alumina catalyst	Sub-dewpoint Claus tail gas processes (i.e., CBA Sulfreen, MCRC)		Sph	45	Activated alumina	Activated alumina	✓
S-701	Promoted Sulfur recovery catalyst	High CS$_2$ and COS conversion. For use in selected TGCU processes (i.e., Sulften)		Klover-leaf* ext.	52	"P"	"P"	✓
PROCATALYSE								
HR 103	Total hydrogenation of S compounds into H$_2$S	Claus tail gas	Sph	0.75 g/cc	Al$_2$O$_3$	Co Mo	✓	
RHONE POULENC								
A 2.5	Catalysts for Sulfreen Process	Claus Plant effluent		Sph	0.77 g/cc	Alumina	—	✓
CRS 31	Oxidation of H$_2$S into Sulfur			Ext	0.95 g/cc	Titanium oxide		✓
AM 2.5	Catalyst protection (Sulfreen units)			Sph	[illegible] g/cc	Alumina	Fe	✓
SHELL CHEMICAL								
S 099	Incineration of Claus and/or SCOT tailgas	Claus and SCOT unit tailgas		Sph	0.78 g/cc	Alumina	—	✓
S 599	Support function, replaces inert ceramic material			Sph	0.78 g/cc	Alumina	—	✓
S 524	Conversion of S compounds into H$_2$S	Claus unit tail gas		Sph	0.77 g/cc	Alumina	Ni/Mo	✓
S 534				Sph	0.77 g/cc	Alumina	Co/Mo	✓
UNOCAL CORP.								
Selectox-33	Solid catalyst for oxidation of H$_2$S to Sulfur and catalytic incineration of SO$_2$	Claus tail gas, acid gas		Cyl/Ext	"P"	"P" Licensees	Non-noble metals	BSR/Selectox, Selectox, Recycle Selectox Process
Selectox-32				Cyl/Ext	"P"	"P"	—	—
N-25	Hydrogenation/hydrolysis of gaseous sulfur compounds			Cyl/Ext	"P"	"P"	"P"	Beavon Sulfur Removal; (BSR) Licensees
N-39				Cyl/Ext	"P"	"P"	"P"	Beavon Sulfur Removal (BSR) Licensees
N-239			H$_2$S	—	—	—	Co/Mo	
UNITED CATALYSTS INC.								
C29-2-02		Claus tail gas		Ext	37	Al$_2$O$_3$	Co/Mo	✓
C29-2-03	Stabilized carrier (SC)			Ext	—	—	—	✓
C29-2-04	(SC) plus lower metals			—	—	—	—	✓
C29-3-03	(SC) plus spherical form (SF)			Spheres	55	—	—	

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
C29-3-04	(SC), (SF), plus lower metals	—		—	50	—	—	✓
C29-4-03	Composition, (SC), (SF)	—		—	55	—	Ni Mo	✓
N-239	(See Unocal Corp., Claus Unit Tail Gas)							
G-41P	COS hydrolysis	High CS_2 & COS Conversion		Ext.	34-38	Al_2O_3	"P"	✓

Other refining catalysts

	Purpose of catalyst	Application (feedstock)	Application (product)	Form (sphere ring, cylinder, etc.)	Bulk density	Carrier, support	Active agents	Availability unrestricted sale: ✓, except where noted.
AMERICAN CYANAMID CO.								
TSR-10	(See Unocal "Other refining catalysts")							
SOAR-10								
BASF AG								
0.3-14	High selectivity	$HCl/O_2/C_2H_4$	EDC	5mm rings	0.80 kg/l	Alumina	CuCl/KCl	✓
0.4-26	High yield and purity	O-Xylene	Phthalic anhydride	rings	1.0 kg/l		V_2O_5	BASF licensees
BP								
CDW-12	Producing specialty and lube oils	Distillates and raffinates	High quality specialty and lube oil	Cyl		Zeolite	Noble metal	Licensees of BP catalytic dewaxing-process
CDW-14	Improving low temp. properties of middle distillates	Kerosenes gas oils	Jet fuels, kerosenes diesel oils heating oils	Cyl		Zeolite	Noble metal	Licensees of BP's catalytic dewaxing process
FF-62	Lube oil color improvement	Solvent refined lube oils	Finished lube oils	Sph		"P"	"P"	BP Ferrofining process
ENGELHARD CORP.								
HZ-1*	Gas oil cracking in Houdriflow and TCC units. HZ-1 is octane catalyst	HGO	Olefins, LPG, and LCO production	Ext	0.95 g/cc	In-situ zeolites on Si Al	Zeolites No rare earth	✓
HZ-PLUS*	High attrition resistant version of HZ-1	HGO	Olefins, LPG, and LCO production	Ext	0.95 g/cc	In-situ zeolites on Si Al	Zeolites No rare earth	✓
EMCAT*-100	Rare earth exchanged version of HZ-P for maximum liquid yield	HGO, toluene and mixed C_9 transalkylation	LPG, gasoline and LCO; xylenes and benzene	Ext	0.95 g/cc	In-situ zeolites on Si Al	Zeolites Rare earth exearth exchanged	✓
EMCAT*-80	Lower activity version of Emcat-100	—	—	Ext	0.95 g/c	In-situ zeolites on Si Al	—	✓
HZ-PLUS*, EMCAT*-100P and EMCAT*-80P	Prepromoted products for max. CO burning	Heavy gas oil cracking	LPG gasoline and LCO	Ext	0.95 g/cc	In-situ zeolites on Si Al	Zeolite-non rare earth (HZ-P) and rare earth exchanged (EMCAT)	✓
HRD-264	Sulfur removal	Reformer feedstock	Pretreated naphtha or untreated low S naphtha	Cyl	"P"	"P"	"P"	Licensing
HALDOR TOPSOE								
HTZ-3	Fine desulfurization of steam reforming feed stocks	Methane, LPG, naphtha, ref. off gas	Sulfur free hydrocarbon	Extrusions	78		ZnO	✓
SK-12	High temperature CO conversion	Steam reforming effluent	Gas with 2-3% CO	Cyl	65		Oxides of Fe Cr	✓
LSK	Low temperature CO conversion, regenerable, chlorine resistant	HT-shift effluent	Gas with 0.1-0.3% CO	Cyl	66		Cu, Oxides of Zn Cr	✓
LK-801	Low temperature CO conversion, sulfur resistant	HT-shift effluent	Gas with 0.1-0.3% CO	Cyl	67		Cu, oxides of Zn Al	✓
PK-5	Methanation	H_2 with up to 2% $(CO + CO_2)$	H_2 without oxygen containing contaminants	Extruded rings	39	Alumina	Ni	✓
INSTITUTO MEXICANO DEL PETRO O								
IMP-TPC-1	Cumene production	Benzene Propane-Propylene	Cumene	Cyl	0.86-0.95 g/cu cm	—	Fe-K as oxides	IMP
IMP-ES-1	Styrene production	Ethylbenzene water vapor	Styrene	Cyl (Ext.)	1.0-1.4 g/cu cm	—	Fe-K as oxides	IMP
PROCATALYSE								
RS 103	Oxidation of S compounds	S-H_2S, COS-CS_2, RSH	SO_2	Sph		Al_2O_3	Metallic oxides	✓
DN 281	NOx reduction	Industrial gas	N_2	Sph		Al_2O_3	Metallic oxides	✓
FF 62	Lube oil hydrofinishing	Extracted lube oil	Finished base oil	Sph		Al_2O_3		Licensees BP process

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb/cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
HR 346	Wax hydrotreating	Slack wax	Food grade wax	Cyl		Al_2O_3	Ni-Mo	✓
SHELL CHEMICAL								
S 538	CO/H_2O shift reactions	Treatment of coal and oil gasification derived syngas		Sph	0.82 g/cc	Alumina	Co/Mo	Sale
UNOCAL CORP.								
TSR-10	Trace sulfur removal	Naphthas	Feed to catalytic reformer	Shaped ext	“P”	“P”	“P”	TSR process Licensees
TSR-11	—	—	—	—	“P”	“P”	“P”	—
SOAR-100	Arsenic removal	Shale oil, coal liquids, etc	Low arsenic product	Shaped Ext	“P”	“P”	“P”	Shale oil process licensees
UNITED CATALYSTS								
C53-2-01	COS hydrolysis	FCC propylene propane off gas		Ext	28-32	Al_2O_3	PTS	✓
G-132	Arsine removal	—		Tab	75-85		Cu	✓
C28-1-01	Sulfur removal	Naphthas, feed to cat reformer		Ext	45-50	“P”	“P”	✓
TSR-11	(See Unocal COrp., other refining catalysts)							
C125-1-01	HCl removal	H_2 offgas cat reformer		Ext	47-53	Zn	Ca	✓
G-92	—	—		sph	49-55	Al_2O_3	Na	✓
UOP INC.								
TA-3	Transalkylation	Toluene and C_9 aromatics	Benzene, xylenes	Cyl	47	“P”	“P”	Licensees
DEH-5	Paraffin dehydrogenation	C_6 to C_{20} paraffins	C_6 to C_{20} monoolefins	Sph	19	Alumina	Pt	—
DEH-6	Light paraffin dehydrogenation	C_3 to C_5 paraffins	C_3 to C_5 monoolefins	Sph	37	Alumina	“P”	—
DEH-7	Paraffin dehydrogenation	C_6-C_{20} n-paraffins	C_6-C_{20} monolefins	Sph	20	Al_2O_3	“P”	
SOX-3	Gas phase sulfur removal	Stack gas		Sph	22	Alumina	Cu	—
NOX-3	Gas phase NOx removal	Stack gas		Sph	50	TiO_2	V and W	Licensees
A-2	Alkylation of benzene with ethylene	Ethylene & benzene	Ethylbenzene	Sph	35	Alumina	“P”	—
KALI-CHEMIE AG								
KC PERLKATOR series	Moving bed catalytic cracking in TCC and Houdriflow operation	Gas oil cracking	C_3C_4 - Olefins, LCO	Beads which give -low attrition-high crush strengths	0.8 g/cc	Silica/Alumina	Acid sites	KC-Perlkator equivalent to Durabead manufactured under license of Mobil Oil Corp.
D 1	TCC/HCC	HGO/VGO	—	Bead	0.80 g/cc	—	Amorphous aluminosilicate	✓
D8	—	—	Gasoline distillate	—	0.90 g/cc	—	Stabilized zeolites	✓
D9A	—	—	—	—	—	—	—	✓
D10A	TCC/HCC with max. CO burning in kiln gas	—	—	—	—	—	Stabilized zeolites with CO combustion promoter	—
DNZ	TCC/HCC	—	High octane gasoline	—	—	—	Stabilized zeolites	✓
XP-catalyst	Xylenes-Plus process	Transalkylation and disproportionation of Toluen	Xylenes benzene	—	—	—	Rare earth exchanged Zeolites	✓

Combustion Promotors (FCC)

Catalyst designation	Primary distinguishing characteristics	Application	Additive to or component of catalyst	Form	Carrier, support	Active agents	Available to refiners by:
AKZO CHEMIE/AKZO CHEMIE AMERICA/KETJEN CATALYSTS							
Ketjenoxycat-50 (KOC-50)	Stability	CO combustion		Powder	Alumina	Pt	✓
AMBUR CHEMICAL CO. INC.							
CCA Brand combustion promoters	Utilize a combination of noble metals on an active alumina substrate	All FCC units where CO combustion promotion is desired	Additive	Powder	High purity alumina	Platinum & Palladium	✓
CCA-1*	Highest activity	Partial or complete combustion of CO	Additive to FCC catalyst	Powder	Alumina	Platinum & Palladium	✓
CCA-5+*	High activity	—	—	—	—	—	—
CCA-7*	High activity improved support	—	—	Spray-dried microsphere	Platinum	—	✓

OGJ international refining-catalyst compilation—continued

Catalyst designation	Primary differentiating characteristics	Application (feedstock)	Application (product)	Form	Bulk density (compacted, lb cu ft unless noted)	Carrier, support	Active agents	Availability to refiner by unrestricted sale: ✓, except where noted
CCA-8*						Platinum & palladium		
CATALYSTS & CHEMICALS INDUSTRIES CO. LTD.								
SP-10S	CO combustion solid promoter	FCC feed		Sph	0.90 g/cc	Alumina	'P'	
DAVISON CHEMICAL DIVISION, W.R. GRACE & CO.								
CP-3	High activity/stability	Partial and complete CO combustion	Additive		Microsph	'P'	'P'	
ENGELHARD CORP.								
COCAT*-1	Low activity	Partial CO combustion regeneration	Additive to FCC catalyst		Micro-sph	Si Al	Precious metal	
COCAT*-5	High activity	Full CO combustion FCC regeneration	Additive to FCC catalyst		Micro-sph	Si Al	Precious metal	
COCAT*-7	High activity improved support	Full CO combustion FCC regeneration	Additive to FCC catalyst		Micro-sph	Si Al	Precious metal	
KATALISTIKS INC.								
KCP-8	High activity	Partial and complete combustion of CO	Additive or blended with FCC catalyst		0.80 g/cc (ABD)	'P'	Precious metals	
KCP-5	Medium activity				0.80 g/cc (ABD)	'P'		
UOP INC.								
UNICAT* CI-3	Active metal impregnated on carrier base	For combustion in-situ of CO in FCCU regenerator	Added with normal catalyst makeup to achieve a level of 0.5 wt ppm Pt on catalyst inventory		Powder	Alumina, Silica Alumina	Platinum	Sale
W.R. GRACE CATALYSTS PTY. LTD.								
CP-3	(See Davison Chemical Division W.R. Grace & Co. FCC listing)							

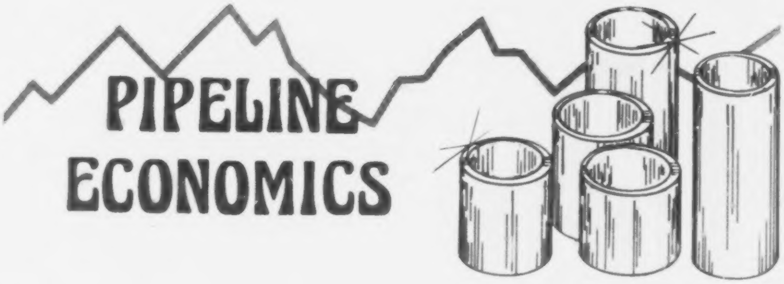
Sulfur oxides reduction catalyst (FCC)

Catalyst designation (list all in a series)	Characteristics	Form	How introduced to FCC system
ARCO PETROLEUM PRODUCTS CO.			
ARCO HRD-276	Combines with SOx in regenerator releases it as H_2S in reactor	Additive, not cracking catalyst	Batch or continuous
DAVISON CHEMICAL DIV. W. R. GRACE			
Additive R	Additive designed to reduce regenerator flueMicrosph gas sox emissions	cracking catalyst	Via separate
ENGELHARD CORP.			
ULTRASOX*	ABD-0.9 gm/cc typical FCC particle size SA-200m²/gm (fresh) Engelhard attrition index-0.7 wt% second P	Typical FCC catalyst	As fresh makeup. This catalyst incorporates zeolite activity, selectivity and SOx reduction into one - add to system same as std. FCC cat.
MAGNASIV 370S			
W.R. GRACE CATALYSTS PTY. LTD.			
Additive R	(See Davison Chemical Div. FCC listing)		
KATALISTIKS INC.			
Desox	Removes SOx from FCC flue gas and releases as H_2S in Rx products	Microsphere, 0.73 g/cc (ABD)	Additive or blended with FCC catalyst

Abbreviations for catalyst compilation

ABD — Apparent bulk density
AGO — Atmospheric gas oil
HC — Hydrocracking, or -cracked
Cyl. — Cylinder
DAO — Deasphalted oil
DO — Diesel oil
Ext. — Extrudate
HAGO — Heavy atmospheric gas oil
HDM — Hydrodemetallization
HDN — Hydrodenitrogenation
HDS — Hydrodesulfurization
HDT — Hydrotreating, or -treated
HFO — Heavy fuel oil
HGO — Heavy gas oil
NVGO — Heavy vacuum gas oil
LCO — Light cycle oil
LGO — Light gas oil
LSFO — Low sulfur fuel oil
LSR — Light straight-run
'P' — Proprietary
RDS — Resid desulfurization
Sph — Sphere
VGO — Vacuum gas oil

OGJ REPORT



PIPELINE ECONOMICS

Current pipeline costs

Size, in.	Location	Miles	Material($)	Labor($)	Misc. ($)*	R.O.W. & damages($)	Total($)	$/mile
ONSHORE PIPELINES								
2	S. Dakota	5	84,214	141,122	79,551	23,124	328,011	65,602
4	Montana†	1.2	18,000	9,500	11,780	—	39,280	32,733
4	Kansas	15.4	255,000	180,000	75,000	90,000	600,000	38,961
6	Alabama	37.5	861,369	736,700	146,568	380,400	2,125,037	56,668
6	S. Dakota	48.5	816,465	1,368,195	696,430	224,190	3,105,280	64,026
8	Illinois	2	90,000	284,000	80,732	3,000	457,732	228,866
8	Texas	2.5	121,412	72,118	5,828	—	199,358	79,743
8	S. Dakota	7.5	126,321	211,683	108,832	34,686	481,522	64,203
10	Connecticut§	4.4	294,000	1,766,000	435,716	582,000	3,077,716	699,481
10	Rhode Island§	3.9	264,000	1,548,000	249,702	526,000	2,587,702	663,513
10	Arkansas	0.57	46,200	74,800	26,542	—	105,962	185,898
10	Delaware§	13.3	709,592	879,127	223,484	1,663	1,813,866	136,381
12	Louisiana	0.5	120,400	49,700	68,330	11,000	249,430	498,860
12	New York	1.9	300,000	75,000	14,889	1,500	391,389	205,994
12	Massachusetts§	2.5	232,000	969,000	254,871	463,000	1,918,871	767,548
12	Kansas	5.1	297,000	248,000	92,000	35,000	672,000	131,765
12	Ark.-Tex.	9.0	719,790	1,058,040	467,170	288,000	2,533,000	281,444
12	Pennsylvania§	10.7	709,122	839,262	221,924	16,264	1,786,572	166,969
12	Michigan§	15.1	1,196,800	1,638,700	890,600	181,200	3,907,300	258,762
12	Arkansas	19.5	1,515,460	2,598,460	980,431	249,600	5,343,951	274,049
12	Arizona	19.8	1,185,000	1,476,000	892,137	990,000	4,543,137	229,451
16	Wyoming	19.3	1,667,000	996,000	411,000	166,000	3,240,000	167,876
16	Wyoming	27.2	2,230,000	1,289,000	550,000	231,000	4,300,000	158,088
16	Neb.-Kansas	118.0	9,350,000	5,563,000	2,344,000	1,003,000	18,260,000	154,746
20	New York†	0.4	75,000	16,900	49,335	—	141,235	353,088
20	California	16.0	5,648,762	7,500,478	4,694,913	2,595,111	20,439,264	1,277,454
20	Wyoming	17.71	3,045,000	2,378,000	2,526,000	42,000	7,991,000	451,214
20	California	44.0	5,867,400	5,014,700	4,053,697	5,866,700	20,802,497	472,784
22	Tennessee§¶	0.7	462,200	1,381,800	186,000	10,000	2,040,000	2,914,286
24	Texas	0.6	245,900	2,025,400	642,944	22,000	2,936,244	4,893,740
24	Ohio§	1.2	264,700	251,000	62,370	15,000	593,070	494,225
24	W. Virginia†	1.9	398,000	810,000	186,951	15,000	1,409,951	742,079
24	W. Virginia†	2.5	517,000	860,000	192,030	19,000	1,588,030	635,212
24	New Jersey	3.44	1,909,883	3,004,556	1,257,026	181,632	6,353,097	1,846,830
24	W. Virginia†	4.2	851,600	1,500,500	409,830	35,000	2,796,930	665,936
24	W. Virginia†	7.5	1,621,000	3,105,000	811,996	50,000	5,587,996	745,066
24	Texas	10.8	4,964,500	4,764,100	2,886,764	288,000	12,903,364	1,194,756
24	Kentucky†	10.8	2,131,200	5,289,800	1,236,023	135,000	8,792,023	814,076
24	California	17.0	3,413,700	2,452,370	1,698,171	1,121,400	8,685,641	510,920
24	Texas	24.9	12,376,800	8,067,200	5,909,980	52,000	26,405,980	1,060,481
24	New York	27.7	4,481,000	5,888,670	1,721,446	909,000	13,000,116	469,318
24	Texas	29.2	8,848,700	5,274,100	4,480,336	934,000	19,537,136	669,080
30	Louisiana†¶	0.76	794,820	2,955,000	612,180	30,000	4,392,000	5,778,947
30	New Jersey§	15.6	6,116,000	11,189,000	2,927,441	2,173,000	22,405,441	1,436,246
30	New York†	19.8	6,720,930	6,598,070	905,811	714,000	14,938,811	754,485
30	Alabama	24.5	6,952,000	5,890,000	2,942,675	597,000	16,381,675	668,640
30	California	75.0	22,857,200	16,084,300	13,237,021	4,681,000	56,859,521	758,127
36	Louisiana¶	0.78	882,500	3,438,500	700,000	5,000	5,026,000	6,443,590
36	New Jersey§	4.13	2,736,150	5,149,052	1,959,329	264,320	10,108,851	2,447,664
36	Illinois	11.1	3,922,000	2,817,000	1,411,820	302,000	8,452,820	761,515
36	Iowa-Ill.†	81.0	31,000,000	16,035,000	1,407,510	2,521,000	50,963,510	629,179
36	Arizona-Calif.	322.5	108,532,300	75,661,190	49,027,824	18,497,500	251,718,814	780,523
36	Minn., Wis., Mich.§	350.4	134,756,100	122,660,500	27,938,000	3,854,400	289,209,000	825,368
36	California	762.0	315,234,500	228,821,200	158,886,129	8,208,000	711,149,829	933,267
42	Georgia§	5.44	3,196,564	1,974,896	1,300,392	87,200	6,559,052	1,205,708
OFFSHORE PIPELINES								
6	Texas	5.67	363,100	880,000	237,100	19,800	1,500,000	264,550
10	Texas	15.0	2,587,600	2,960,600	1,662,824	2,000	7,213,024	480,868
12	Louisiana	7.6	1,394,000	2,120,000	1,011,290	—	4,525,290	595,433
12	Texas	8.0	1,200,000	1,934,000	1,194,500	—	4,328,500	541,062
12	Texas	14.1	2,576,800	3,439,100	1,838,376	19,000	7,873,276	558,388
12	Texas	15.6	2,848,200	3,653,400	1,979,928	2,000	8,483,528	543,816
20	California	10	4,850,948	7,240,598	8,375,062	1,208,427	21,675,035	2,167,504

Source: U.S. FERC construction permit applications, 6/1/84-6/1/85. *Includes engr., supv., surveying, interest, adm. & overheads, contingencies, and FERC fees. †Replacement. §Loop. ¶River crossing.

10-year onshore construction-cost trend

Size	Year*	Average cost, $/mile					Range, $/mile	
		R.O.W.	Material	Labor	Misc.	Total	Low	High
8 in.	1985	3,141	28,144	47,317	16,283	94,884	64,203	228,866
	1984	22,339	49,974	175,733	74,086	322,132	223,767	540,655
	1983	6,244	48,392	89,600	23,088	167,324	159,940	178,020
	1982	8,996	46,002	67,950	31,769	154,717	73,596	572,926
	1981	8,119	34,860	23,528	20,884	87,391	55,981	109,078
	1980	8,247	39,040	102,839	13,036	163,162	149,926	200,554
	1979	1,189	40,692	63,518	14,951	123,350	50,374	581,916
	1978	1,590	32,123	30,554	8,660	72,927	61,614	109,956
	1977	1,403	34,423	27,002	8,963	71,791	28,844	126,063
	1976	....	....	....	....	....	....	....
12 in.	1985	26,582	74,620	106,447	46,164	253,813	131,765	767,548
	1984	23,035	147,750	211,783	93,481	476,050	338,872	608,685
	1983	5,135	91,492	73,042	20,754	190,423	177,050	218,265
	1982	10,536	84,972	102,390	32,173	230,071	130,252	669,227
	1981	3,855	71,444	65,613	11,861	152,773	55,981	369,018
	1980	2,610	54,235	41,089	14,111	112,045	78,428	901,282
	1979	1,590	46,062	47,283	7,121	102,056	96,822	158,185
	1978	6,697	55,362	61,919	13,830	137,808	(†)	(†)
	1977	4,332	34,429	22,658	4,573	65,992	53,839	177,694
	1976	....	....	....	....	....	....	....
16 in.	1985	8,511	80,529	47,708	20,091	156,839	154,746	167,876
	1984	15,106	131,139	111,234	82,747	340,226	231,790	363,718
	1983	31,542	337,088	929,969	278,159	1,576,758	447,890	2,370,748
	1982	6,278	104,319	113,380	21,936	245,913	175,715	430,841
	1981	9,203	110,684	133,968	40,424	294,279	140,674	590,112
	1980	7,404	74,571	57,681	18,050	157,706	118,085	471,972
	1979	....	....	....	....	....	....	....
	1978	7,506	54,936	54,117	12,552	129,111	86,898	203,721
	1977	3,635	50,574	32,260	9,347	95,817	68,897	145,916
	1976	3,248	80,373	26,575	9,419	119,615	(†)	(†)
20 in.	1985	108,870	187,379	190,886	144,974	632,109	353,088	1,277,454
	1984	16,735	175,406	190,088	63,302	445,531	226,415	616,250
	1983	12,682	147,354	154,811	46,073	360,934	237,600	476,104
	1982	12,284	124,148	128,148	30,649	295,229	210,378	482,464
	1981	8,556	122,659	114,147	30,370	275,732	227,679	1,741,597
	1980	11,470	130,438	73,751	48,213	263,872	157,947	533,265
	1979	....	....	....	....	....	....	....
	1978	3,235	101,052	83,810	12,346	200,443	153,959	242,685
	1977	5,415	95,045	85,842	16,044	202,346	110,349	312,337
	1976	....	....	....	....	....	....	....
24 in.	1985	26,648	296,486	305,437	151,657	780,228	469,318	4,893,740
	1984	29,133	289,487	298,521	128,390	745,531	395,676	1,772,049
	1983	31,416	310,583	501,401	148,993	995,393	608,781	1,649,454
	1982	28,537	508,226	807,847	120,895	1,465,505	(†)	(†)
	1981	30,078	269,414	395,204	127,790	822,486	350,898	826,088
	1980	14,220	162,019	152,406	52,114	380,759	230,122	820,295
	1979	5,268	152,878	193,227	19,206	370,579	(†)	(†)
	1978	2,372	112,790	125,435	17,045	257,642	239,480	371,932
	1977	....	....	....	....	....	....	....
	1976	4,784	95,656	94,319	29,755	224,514	(†)	(†)
30 in.	1985	60,408	320,219	314,878	152,035	847,541	668,640	5,778,947
	1984	20,885	336,043	376,631	183,034	916,592	637,546	1,413,826
	1983	23,872	253,071	348,478	116,084	741,506	660,086	1,683,143
	1982	20,756	296,737	362,787	93,103	773,383	548,396	1,179,760
	1981	14,135	309,364	201,037	73,281	597,817	561,358	4,684,745
	1980	13,206	227,229	134,491	46,018	420,944	319,482	921,772
	1979	25,884	239,454	290,474	35,752	591,560	529,178	604,298
	1978	12,231	187,718	216,264	20,895	437,108	(†)	(†)
	1977	6,485	147,814	91,862	22,469	268,630	266,513	270,684
	1976	22,456	112,497	96,141	19,750	250,844	168,029	471,679
36 in.	1985	21,967	389,751	296,742	157,536	865,997	629,179	6,443,590
	1984	36,063	358,876	362,667	152,787	910,393	665,480	2,143,680
	1983	51,436	498,047	490,568	306,666	1,346,717	703,112	2,724,493
	1982	13,429	375,281	176,287	58,733	623,730	615,160	833,546
	1981	5,948	344,374	358,072	74,415	782,809	693,945	1,573,759
	1980	20,677	344,664	268,753	87,850	721,944	528,710	1,105,515
	1979	20,654	272,397	203,639	57,814	554,504	443,024	682,280
	1978	26,441	199,878	150,667	65,439	442,425	(†)	(†)
	1977	20,101	209,878	115,498	18,366	363,843	(†)	(†)
	1976	....	....	....	....	....	....	....

*1976-1978 based on completed costs reported to the U.S. FERC by fiscal year; 1979-1982 by calendar year. 1983-85 based on FERC construction permit applications, by fiscal year.

†One report only.

Investment in liquids pipelines

Item	A	B	C	D	E	Total, $	Percent
Crude pipelines investment by five companies							
Land	1,468,224	750,450	294,320	995,493	1,179,649	4,688,136	0.31
Right of way	12,080,048	999,669	316,178	16,028,239	14,916,567	44,340,701	2.89
Line pipe	130,340,901	25,628,038	11,262,596	88,057,211	151,786,877	407,075,623	26.57
Line pipe fittings	7,055,240	895,867	1,754,951	16,482,169	24,402,647	50,590,874	3.30
Pipeline construction	178,526,543	26,622,036	15,626,854	202,378,537	206,257,496	629,481,466	41.08
Buildings	11,380,434	4,804,709	2,505,754	13,072,310	8,786,468	40,549,675	2.65
Boilers	—	—	—	—	—	—	
Pumping equipment	17,391,584	5,506,186	2,414,882	16,150,999	47,696,096	89,159,747	5.82
Machine tools and machinery	—	—	—	33,140	1,170	34,310	—
Other station equipment	64,799,310	17,813,840	4,487,331	41,804,789	22,644,046	151,549,316	9.89
Oil tanks	14,128,188	6,030,507	5,678,530	16,128,679	26,308,918	68,274,822	4.46
Delivery facilities	—	—	5,237,731	2,385,266	6,840,273	14,463,270	0.94
Communications systems	421,842	2,781,997	4,709	9,883,817	2,764,037	15,856,402	1.03
Office furniture & equipment	464,194	190,620	146,006	775,120	2,175,932	2,751,872	0.18
Vehicles and other work equip	5,861,026	1,706,069	436,349	5,273,635	228,311	13,505,390	0.88
Other property	—	—	—	—	49,795	49,795	
Total	443,987,534	93,729,988	50,166,191	429,449,404	515,038,282	1,532,371,399	
Product pipelines investment by five companies							
Land	4,272,888	1,743,257	531,121	852,997	3,114,965	10,515,228	0.3
Right of way	27,713,049	10,819,971	17,835,395	8,367,898	7,461,603	72,197,916	2.6
Line pipe	338,178,215	67,541,298	105,731,596	85,414,529	109,412,714	706,278,352	25.2
Line pipe fittings	71,507,597	12,504,831	14,085,393	1,577,520	17,054,974	116,730,315	4.2
Pipeline construction	554,725,571	108,360,484	192,334,845	93,622,099	158,121,584	1,107,164,583	39.6
Buildings	22,985,337	3,793,816	4,400,997	9,984,589	16,363,724	57,528,463	2.1
Boilers	—	—	—	—	—	—	
Pumping equipment	45,769,804	5,776,637	29,756,285	27,537,862	22,826,958	131,667,546	4.7
Machine tools & machinery	—		—	—	293,539	293,539	—
Other station equipment	115,430,887	20,207,893	34,252,981	22,694,228	81,558,146	274,144,135	9.8
Oil tanks	47,851,926	16,993,316	8,711,979	17,444,107	40,169,627	131,170,955	4.7
Delivery facilities	—		9,458,609	10,546,656	38,620,446	58,625,711	2.1
Communication systems	1,000,119	258,698	1,975,297	7,723,139	—	10,957,253	0.4
Office furniture & equipment	9,078,016	1,282,230	1,315,486	479,842	452,383	12,607,957	0.4
Vehicles & other work equip	4,804,472	1,476,132	5,773,167	1,834,884	1,355,744	15,244,399	0.6
Other property	72,798,033	—	18,542,778	—	—	91,340,811	3.3
Total	1,316,115,914	250,758,563	444,705,929	288,080,350	496,806,407	2,796,467,163	

Source: U.S. FERC form 6 pipeline annual reports-1984

LIQUIDS PIPELINES

	Miles of pipeline				Deliveries, 1,000 bbl			Total trunk-line traffic, million bbl-miles*			Fiscal data, $1,000			
		Trunk												
Company	Gathering	Crude	Products	Total	Crude	Products	Total	Crude	Products	Total	Carrier property	Change	Operating revenue	Income
Acorn Pipeline Co.	—	—	—	—	3,293	—	3,293	1,423	—	1,423	3,363	7	—	—
Air Force Pipeline Co.	—	—	5	5	—	1,288	1,288	—	6	6	353	—	168	37
Algonquin Pipeline Co.	58	61	—	119	784	—	784	15	—	15	2,952	79	651	77
Allegheny Pipeline Co.	—	—	603	603	—	12,490	12,490	—	4,589	4,589	27,784	-8	7,778	2,415
Amerada Hess Pipeline Corp.	—	†818	—	†818	9,060	—	9,060	7,201	—	7,201	148,854	434	57,990	23,868
American Petrofina Pipeline Co.	10	1,067	28	1,105	29,878	13,873	43,751	7,624	33	7,657	23,183	—	11,086	21,161
Amoco Pipeline Co.	2,263	7,986	2,082	12,331	132,105	6,509	138,614	132,105	6,509	138,614	529,902	29,096	222,502	93,923
Arco Pipe Line Co.	1,672	†2,552	3,778	†8,002	434,323	167,494	601,817	150,328	18,342	168,670	2,439,710	13,917	901,217	293,191
Asamera Pipeline Inc.	—	—	—	—	2,397	—	2,397	2	—	2	2,403	2,403	467	-117
Ashland Pipe Line Co.	505	787	—	1,292	89,789	—	89,789	50,147	—	50,147	96,582	6,869	35,911	10,358
Badger Pipe Line Co.	—	—	180	180	—	69,609	69,609	—	4,138	4,138	24,354	196	13,073	2,663
Belle Fourche Pipeline Co.	1,084	729	—	1,813	33,656	—	33,656	3,525	—	3,525	51,104	1,678	19,310	8,516
Black Lake Pipe Line Co.	—	255	—	255	4,181	—	4,181	762	—	762	10,051	—	1,469	103
BP Pipelines Inc.	—	†818	—	†818	100,543	—	100,543	80,133	—	80,133	1,606	4,055	624,099	236,408
Buckeye Pipe Line Co. of Michigan Inc. (New)	—	130	—	130	12,154	—	12,154	1,440	—	1,440	13,127	13,127	3,561	946
Buckeye Pipe Line Co.	—	—	3,344	3,344	6,223	250,385	256,608	735	33,368	34,103	345,087	-7,854	111,236	22,914

LIQUIDS PIPELINES (Continued)

Company	Miles of pipeline				Deliveries, 1,000 bbl			Total trunk-line traffic, million bbl-miles*			Fiscal data, $1,000			
		Trunk												
	Gathering	Crude	Products	Total	Crude	Products	Total	Crude	Products	Total	Carrier property	Change	Operating revenue	Income
Butte Pipe Line Co.	—	373	—	373	32,681	—	32,681	9,196	—	9,196	18,099	7	11,130	3,212
C & T Pipeline, Inc.	—	—	62	62	—	39	39	—	2	2	351	—	21	-622
Calnev P[illegible] Line Co.	22	65	566	653	—	24,067	24,067	—	4,765	4,765	35,509	2,609	15,223	6,443
Cenergy [illegible]nsmission Co.	—	—	—	—	13	—	13	§	—	§	936	17	78	-96
Chase Transportation Co.	—	—	716	716	—	15,341	15,341	—	10,984	10,984	38,256	-29	8,126	5,652
Chevron Pipe Line Co.	214	1,438	1,490	3,142	162,832	38,534	201,366	15,988	9,542	25,530	222,384	18,853	94,990	27,326
Chicap Pipe Line Co.	—	235	—	235	50,982	1,541	52,523	7,854	1	7,855	33,083	-5,393	6,500	1,178
Chisholm Pipeline Co.	—	—	203	203	—	12,478	12,478	—	2,533	2,533	19,260	1,837	4,999	1,711
Ciniza Pipe Line Inc.	223	135	11	369	6,567	1,143	7,710	386	13	399	6,849	21	2,760	178
Citgo Pipe Line Co.	622	899	106	1,627	71,578	—	71,578	6,818	—	6,818	44,439	344	28,428	8,123
Cities Service NGL Pipe Line Co.	—	—	106	106	—	2,207	2,207	—	235	235	3,210	-1	868	196
CKB Petroleum Inc.¶	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Clarco Pipeline Co.	90	—	—	90	2,550	—	2,550	§	—	§	3,350	22	618	241
CNG Pipeline Co.	—	—	—	—	1,906	—	1,906	§	—	§	4,185	665	1,539	522
Cochin Pipeline System	—	—	1,200	1,200	—	24,378	24,378	—	24,529	24,529	239,996	264	68,490	45,897
Collins Pipeline Co.	—	—	124	124	—	28,417	28,417	—	3,555	3,555	14,370	—	3,524	913
Colonial Pipeline Co.	—	—	5,267	5,267	—	589,401	589,401	—	634,233	634,233	1,319,345	5,467	470,541	120,894
Continental Pipe Line Co.	4,058	1,523	1,922	7,503	198,958	53,440	252,398	11,690	11,424	23,114	172,082	6,819	76,374	35,461
Cook Inlet Pipe Line Co.	—	55	—	55	16,619	—	16,619	509	—	509	42,503	140	20,280	4,962
Crown-Rancho Pipe Line Corp.	7	—	—	7	15,092	—	15,092	6,920	—	6,920	2,214	3	1,476	1,055
Diamond Shamrock Refining & Marketing Co.	—	—	622	622	—	18,825	18,825	—	10,119	10,119	33,343	1,261	15,014	3,303
Dixie Pipeline Co.	—	—	1,303	1,303	—	31,197	31,197	—	16,343	16,343	72,061	402	40,400	9,457
Dome Pipeline Corp.	1	8	130	139	—	29,536	29,536	—	1,912	1,912	22,053	12	4,780	11,310
El Paso Frontera Corp.	—	—	—	—	506	—	506	55	—	55	1,378	—	676	161
Emerald Pipe Line Corp.	—	—	113	113	—	2,931	2,931	—	246	246	1,430	—	809	173
Enterprise Pipeline Co.	—	—	98	98	—	5,088	5,088	—	499	499	20,189	—	3,393	2,190
Enterprise Products Co. of Mississippi	—	—	268	268	—	6,554	6,554	—	1,756	1,756	49,924	24,197	4,150	-959
Eureka Pipe Line Co.	866	6	—	872	2,992	—	2,992	2	—	2	16,832	—	8,648	906
Explorer Pipeline Co.	—	—	1,397	1,397	—	165,702	165,702	—	117,838	117,838	252,581	1,561	75,065	15,220
Exxon Pipeline Co.	1,861	4,987	2,458	9,306	467,060	175,299	642,359	152,933	7,117	160,050	2,120,105	7,695	834,353	399,180
Farmland Industries Inc.	652	239	—	891	20,972	—	20,972	554	—	554	10,744	250	3,366	755
Four Corners Pipe Line Co.	283	1,207	24	1,514	92,315	21,447	113,762	13,445	44	13,489	153,141	11,331	53,329	7,797
Frontier Pipeline Co.	—	290	—	290	5,714	—	5,714	1,657	—	1,657	48,815	1,618	11,429	8,570
G & T Pipeline Co.	—	30	—	30	200	—	200	6	—	6	5,142	—	988	350
General American Pipe Line Co.	—	23	—	23	62	—	62	1	—	1	323	—	126	68
Getty Pipeline Inc.	—	199	368	567	34,342	14,841	49,183	1,351	778	2,129	42,557	2,801	8,211	3,722
Gulf Central Pipeline Co.	—	—	1,946	1,946	—	11,530	11,530	—	9,016	9,016	122,137	541	23,394	5,520
Gulf Pipeline Co.	2,010	1,196	2,041	5,247	265,132	213,958	479,090	11,595	45,426	57,021	292,049	7,773	127,269	39,120
Hess Pipeline Co.	—	242	—	242	26,445	—	26,445	1,781	—	1,781	45,403	-6,425	12,577	-589
Howell Crude Oil Co.	—	6	—	6	—	—	—	—	—	—	1,504	78	45,696	-11
Husky Pipeline Co.	39	43	255	337	1,606	4,357	5,963	31	599	630	1,891	-5,273	2,349	-2,924
Hydrocarbon Transportation Inc.	—	—	1,511	1,511	—	31,301	31,301	—	16,068	16,068	132,332	1,099	39,118	9,[illegible]
Interstate Energy Co.	—	—	94	94	—	8,444	8,444	—	643	643	55,373	128	10,655	—
Interstate Storage & Pipeline Corp.	—	—	23	23	—	1,819	1,819	—	2	2	4,821	82	1,108	111
Jayhawk Pipeline Corp.	241	513	—	754	35,495	—	35,495	3,282	—	3,282	21,473	1,927	7,394	1,265
Jet Lines Inc.	—	—	111	111	—	12,364	12,364	—	668	668	12,252	177	4,614	838
Kaneb Pipe Line Co.	—	—	2,074	2,074	—	45,350	45,350	—	12,414	12,414	102,968	—	33,365	5,787
Kaw Pipe Line Co.	1,394	—	—	1,394	19,654	—	19,654	—	—	—	12,092	109	7,024	1,332
Kerr-McGee Pipeline Corp.	8	56	—	64	952	—	952	23	—	23	4,446	—	1,583	731
Kiantone Pipeline Corp.	—	78	—	78	14,467	—	14,467	1,132	—	1,132	9,705	—	3,232	—
Kuparuk Pipeline Corp. (New)	—	36	—	36	31,737	—	31,737	858	—	858	—	-89,368	2,296	-3,198
Kuparuk Transportation Co.	—	37	—	37	14,401	—	14,401	460	—	460	127,642	79,655	8,174	5,928
Lake Charles Pipe Line Co.	—	—	13	13	—	85,070	85,070	—	337	337	10,724	355	4,129	1,030
Lakehead Pipe Line Co., Inc.	—	2,599	—	2,599	68,207	—	68,207	357,761	—	357,761	446,088	3,803	201,103	57,849
Largo Co., The	—	—	—	—	1,594	—	1,594	77	—	77	5,798	—	2,181	1,089
Laurel Pipe Line Co.	—	—	453	453	—	28,922	28,922	—	4,778	4,778	56,866	28	12,670	1,868
Locap Inc.	—	58	—	58	132,024	—	132,024	7,537	—	7,537	120,377	-2	14,637	-7,908
LOOP Inc.•	—	—	—	—	—	—	—	7,693	—	7,693	—	—	—	—
Marathon Pipe Line Co.	1,037	1,690	1,381	4,108	361,879	199,138	561,017	48,480	14,433	62,913	336,061	7,722	138,983	33,263
Mark Oil Pipeline Co. (New)	—	—	—	—	52	—	52	—	—	—	1,111	1,111	74	49
McMoran Pipeline Co.	—	—	—	—	753	—	753	20	—	20	1,919	—	852	360
Mesa Transmission Co.	—	11	—	11	999	—	999	40	—	40	9,505	66	4,072	1,531
Mid-America Pipeline Co. (MAPCO)	—	19	8,089	8,108	11,003	153,393	164,396	1,325	45,129	46,454	445,880	15,971	105,948	23,381
Mid-Valley Pipeline Co.	—	1,004	—	1,004	77,424	—	77,424	79,591	—	79,591	94,046	-21,251	46,365	9,424
Midland-Lea Inc.	—	101	275	376	2,355	1,702	4,057	275	101	376	20,215	—	2,922	-2,398
Minden Pipeline Co.	—	—	—	—	—	—	—	—	—	—	—	—	377	9
Minnesota Pipe Line Co.	—	443	—	443	62,665	—	62,665	16,042	—	16,042	50,096	29,882	21,276	5,750

LIQUIDS PIPELINES (Continued)

Company	Miles of pipeline: Gathering	Miles of pipeline, Trunk: Crude	Miles of pipeline, Trunk: Products	Miles of pipeline: Total	Deliveries, 1,000 bbl: Crude	Deliveries, 1,000 bbl: Products	Deliveries, 1,000 bbl: Total	Total trunk-line traffic, million bbl-miles*: Crude	Total trunk-line traffic, million bbl-miles*: Products	Total trunk-line traffic, million bbl-miles*: Total	Fiscal data, $1,000: Carrier property	Fiscal data, $1,000: Change	Fiscal data, $1,000: Operating revenue	Fiscal data, $1,000: Income
Mitco Pipeline Co.	9	—	—	9	119	—	119	—	—	—	2,105	—	72	-182
Mobil Alaska Pipeline Co.	—	†818	—	†818	25,121	—	25,121	19,984	—	19,984	396,569	782	155,431	71,781
Mobil Eugene Island Pipeline Co.	—	66	—	66	9,682	—	9,682	916	—	916	29,804	30	9,342	3,321
Mobil Pipeline Co.	4,303	5,201	1,699	11,203	226,962	94,276	321,238	66,187	10,619	76,806	297,572	12,938	166,536	50,862
National Transit Co.	231	—	—	231	661	—	661	—	—	—	3,552	134	1,699	-1,076
Navajo Pipeline Co.	—	110	323	433	—	5,602	5,602	—	—	—	8,383	8,383	5,890	2,362
Northern Rockies Pipe Line Co.	—	—	—	—	1,177	—	1,177	—	—	—	1,044	—	359	371
NW Pipeline Inc.	—	—	—	—	3,068	—	3,068	354	—	354	5,738	-18	2,432	1,689
Ohio Oil Gathering Corp. II	750	—	—	750	5,383	—	5,383	—	—	—	10,320	3,224	11,302	793
Ohio River Pipe Line Co.	—	—	400	400	—	14,552	14,552	—	1,652	1,652	22,251	619	5,903	1,498
Oiltanking of Texas Pipeline Co.	—	19	—	19	11,398	—	11,398	11	—	11	11,298	—	889	-354
Okie Pipe Line Co.	505	—	405	910	8,785	4,817	13,602	—	628	628	17,091	1,921	7,962	1,666
Olympic Pipe Line Co.	—	—	391	391	—	79,659	79,659	—	14,927	14,927	57,537	218	24,811	6,680
Osage Pipe Line Co.	—	136	—	136	31,611	—	31,611	4,299	—	4,299	19,590	—	6,431	1,868
Owensboro-Ashland Co.	—	296	—	296	61,800	—	61,800	16,221	—	16,221	44,347	1,443	10,238	1,867
Paloma Pipeline Co.	—	—	—	—	20,235	—	20,235	2,262	—	2,262	5,798	-29	1,989	360
Pennzoil Offshore Pipeline Co.	—	3	—	3	1,335	—	1,335	37	—	37	2,811	—	1,926	888
Phillips Alaska Pipeline Corp.	—	†818	—	†818	8,183	—	8,183	6,539	—	6,539	126,148	745	50,885	21,279
Phillips Pipe Line Co.	1,060	807	3,731	5,598	85,957	202,220	288,177	13,800	43,274	57,074	311,323	1,521	142,140	37,408
Pioneer Pipe Line Co.	—	—	301	301	—	11,982	11,982	—	2,632	2,632	12,706	124	5,406	1,161
Plantation Pipe Line Co.	—	—	3,158	3,158	—	181,120	181,120	—	116,190	116,190	288,080	501	111,326	26,283
Platt Pipe Line Co.	—	1,281	—	1,281	67,723	—	67,723	42,512	—	42,512	77,541	3,613	40,143	13,350
Pogo Offshore Pipeline Co.	—	—	—	—	4,392	—	4,392	461	—	461	9,336	1	2,983	1,204
Portal Pipe Line Co.	294	615	—	909	28,721	—	28,721	11,419	—	11,419	42,049	1,872	20,542	7,691
Portland Pipe Line Corp.	—	343	—	343	22,802	—	22,802	3,790	—	3,790	50,167	-3,730	16,875	3,855
Powder River Pipeline Corp.	—	—	—	—	1,446	—	1,446	—	—	—	—	-5,978	1,125	5,639
Pure Transmission Co.	820	713	12	1,545	100,077	25,128	125,205	20,076	294	20,370	83,537	1,909	34,786	9,262
Samedan Pipeline Corp.¶	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Santa Fe Pipeline Co.	—	—	912	912	—	34,381	34,381	—	17,183	17,183	52,465	2,889	19,926	6,923
Seminole Pipeline Co.	774	—	—	774	—	41,038	41,038	—	19,060	19,060	202,368	1,006	25,928	5,574
Shamrock Pipe Line Corp., The	637	318	544	1,499	29,589	18,508	48,097	1,552	3,996	5,548	29,687	5,738	15,010	2,489
Shell Pipe Line Corp.	2,043	4,668	416	7,127	373,730	128,968	502,698	85,164	6,590	91,754	432,881	5,100	143,206	44,294
Sohio Pipe Line Co.	1,010	563	60	1,633	325,750	46,883	372,633	192,105	1,566	193,671	3,334,068	-368	1,236,230	420,424
Sonat Oil Transmission Inc.	—	42	—	42	981	—	981	—	—	—	5,206	636	1,039	40
Southcap Pipe Line Co.	—	—	—	—	32,812	—	32,812	20,216	—	20,216	53,589	37	9,244	331
Southern Pacific Pipe Lines Inc.	—	—	2,667	2,667	—	266,644	266,644	—	33,392	33,392	196,116	32,832	95,712	29,812
Sun Oil Line Co. of Michigan	—	—	—	—	—	—	—	—	—	—	669	—	117	42
Sun Pipe Line Co.	547	579	3,012	4,138	54,358	55,142	109,500	3,591	10,799	14,390	133,071	1,928	63,561	26,698
Tecumseh Pipe Line Co.	—	206	—	206	20,126	—	20,126	2,845	—	2,845	15,289	7	3,180	913
Texaco Cities Service Pipe Line Co.	—	34	—	34	18,637	—	18,637	526	—	526	36,044	52	2,475	-2,407
Texas Eastern Transmission Corp.	—	—	3,385	3,385	—	128,028	128,028	—	78,695	78,695	419,777	9,769	106,445	—
Texas Pipe Line Co.	1,243	2,476	518	4,237	283,396	124,729	408,125	66,236	4,985	71,221	274,737	6,982	99,909	26,630
Texas-New Mexico Pipeline Co.	1,847	2,220	—	4,067	151,933	—	151,933	—	26,218	26,218	88,828	645	40,964	11,730
Tomahawk Pipe Line Co.	—	239	—	239	3,109	—	3,109	186	—	186	1,779	267	682	-126
Total Pipeline Corp.	193	583	97	873	36,540	15,060	51,600	4,791	1,306	6,097	41,481	15,820	7,979	-692
Trans Mountain Oil Pipe Line Corp.	—	64	—	64	6,737	—	6,737	354	—	354	6,729	5	1,529	1,131
Trans-Ohio Pipeline Co.	—	—	133	133	—	9,054	9,054	—	398	398	13,843	—	2,560	1,012
Transco Terminal Co. (New)	—	—	—	—	382	—	382	—	—	—	3,119	2	972	193
Union Alaska Pipe Line Co.	—	†818	—	†818	8,066	—	8,066	6,489	—	6,489	125,812	28	49,006	17,418
Wesco Pipe Line Co.	—	746	—	746	73,713	—	73,713	1,143	—	1,143	80,707	10,777	19,675	645
West Emerald Pipe Line Corp.	—	—	296	296	—	2,381	2,381	—	511	511	1,831	109	1,089	132
West Shore Pipe Line Co.	—	—	321	321	—	70,643	70,643	—	8,108	8,108	33,624	496	17,636	4,712
West Texas Gulf Pipe Line Co.	—	581	—	581	124,729	—	124,729	51,422	—	51,422	45,788	646	28,511	9,027
Western Oil Transportation Co., Inc.	579	—	—	579	9,211	—	9,211	—	—	—	32,537	32	4,598	11,103
White Shoal Pipeline Corp.	7	—	—	7	3,973	—	3,973	176	—	176	2,617	—	337	64
Williams Pipe Line Co.	—	82	9,208	9,290	4,413	185,959	190,372	2,543	55,012	57,555	552,726	31,147	151,938	14,628
Wolverine Pipe Line Co.	—	—	620	620	—	73,449	73,449	—	7,997	7,997	71,448	136	19,365	3,530
Wood River Pipeline Co.	—	573	—	573	6,756	—	6,756	3,871	—	3,871	159,016	-230	11,879	261
Wyco Pipe Line Co.	—	—	677	677	—	19,814	19,814	—	3,640	3,640	25,963	764	15,285	5,017
Wyoming Pipeline Co. (New)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Yellowstone Pipe Line Co.	—	—	749	749	—	20,673	20,673	—	6,718	6,718	28,510	59	11,515	2,847
1984 Totals	**36,072**	**56,975**	**80,875**	**173,922**	**5,466,750**	**4,442,112**	**9,908,862**	✓**1,847,193**	✓**1,551,457**	✓**3,398,650**	**19,397,450**	**322,294**	**7,823,582**	**2,544,764**
1983 Totals	**30,966**	**57,466**	**79,387**	**167,819**	**6,020,301**	**4,289,301**	**10,309,602**	**1,875,395**	**1,452,227**	**3,327,622**	**22,254,982**	**2,985,548**	**7,472,286**	**2,352,748**

Source: U.S. FERC Form No. 6: Annual Report of Oil Pipeline Companies, Dec. 31, 1984.

*Some barrel-mile data are provided by the American Petroleum Institute, Policy Analysis Dept. †Mileage represents Trans-Alaska pipeline and is included in totals only once to avoid duplication. §Less than 1 million bbl-miles. ¶FERC filings expected for 1985. •Effective Oct. 3, 1984, exempt from FERC regulation under Deepwater Port Act of 1984. , Revised from initial publication.

Company	Miles of pipeline				Total compressor stations			Total sales, MMcf	Fiscal data, $1,000			
	Transmission	Field	Storage	Total	Transmission	Other	Total		Gas plant	Additions	Operating revenues	Net income
Alabama-Tennessee Natural Gas Co.	—	—	—	—	—	—	—	32,842	20,549	618	128,689	5,679
Algonquin Gas Transmission Co.*	930	—	—	930	3	—	3	189,530	214,331	1,417	760,593	15,275
Algonquin LNG Inc.	—	—	—	—	—	—	—	—	21,788	106	4,521	726
American Distribution Co.†	—	—	—	—	—	—	—	—	—	—	—	—
ANR Pipeline Co.*	7,723	3,491	195	11,409	37	66	103	592,040	2,353,815	57,547	2,666,293	224,760
ANR Storage Co.	—	—	—	—	—	—	—	—	120,843	614	38,545	10,401
Arkansas Oklahoma Gas Corp.	—	—	—	—	—	—	—	—	41,594	3,907	43,626	3,920
Arkla Inc.§	—	—	—	—	—	—	—	252,795	1,192,108	77,133	1,085,520	63,752
Associated Natural Gas Co.	—	—	—	—	—	—	—	12,053	37,705	1,141	60,089	2,819
Bayou Interstate Pipeline System (absorbed West Lake Arthur Corp.)	—	—	—	—	—	—	—	—	42	42	16,214	-409
Bear Creek Storage Co.	—	—	25	25	—	1	1	—	144,481	265	49,636	21,249
Black Marlin Pipeline Co.	—	—	—	—	—	—	—	—	6,717	13	657	480
Blue Dolphin Pipeline Co.	—	—	—	—	—	—	—	2,603	7,499	0	228	—
Bluefield Gas Co.	—	—	—	—	—	—	—	—	2,134	23	6,024	96
Border Gas Inc.	—	—	—	—	—	—	—	—	—	—	231,524	—
Boundary Gas Inc. (new)	—	—	—	—	—	—	—	2,440	—	—	10,677	—
Canyon Creek Compression Co.	1	—	—	1	1	—	1	—	21,893	124	8,401	929
Capital Oil Co. Inc.	—	—	—	—	—	—	—	—	1,448	9	1,010	-156
Caprock Pipeline Co.	—	—	—	—	—	—	—	—	3,770	—	1,168	72
Carnegie Natural Gas Co.	—	—	—	—	—	—	—	18,133	84,354	6,161	78,180	4,311
Celsius Energy Co.†	—	—	—	—	—	—	—	—	—	—	—	—
Chandeleur Pipe Line Co.	—	—	—	—	—	—	—	—	16,038	69	1,423	35
Cimarron Transmission Co.	—	—	—	—	—	—	—	3,602	1,428	51	6,122	48
Colorado Interstate Gas Co.*	2,721	3,190	234	6,145	20	51	71	256,830	686,282	18,166	960,506	106,392
Columbia Gas Transmission Corp.*	10,625	6,860	1,248	18,733	114	76	190	641,786	2,100,682	74,323	3,246,471	75,678
Columbia Gulf Transmission Co.*	4,188	—	—	4,188	13	27	40	—	1,027,874	13,434	208,023	33,895
Columbia LNG Corp.	88	—	—	88	—	—	—	—	202,108	—	41,730	-338
Commercial Pipeline Co., The	—	—	—	—	—	—	—	—	894	13	1,331	58
Consolidated Gas Transmission Corp.*	3,567	4,088	525	8,180	42	26	68	546,673	1,057,944	594,026	2,390,304	86,504
Consolidated System LNG Co.	200	—	—	200	—	—	—	—	267,401	—	985	-15,664
Distrigas of Massachusetts Corp.	—	—	—	—	—	—	—	33,584	45,373	1,806	197,419	5,347
East Tennessee Natural Gas Co.*	1,019	—	—	1,019	11	2	13	72,073	85,034	7,246	277,052	7,440
Eastern Shore Natural Gas Co.	—	—	—	—	—	—	—	13,240	9,981	1,126	61,700	2,690
El Paso Natural Gas Co.*	9,337	12,432	18	21,787	54	64	118	941,813	3,099,128	43,312	4,039,126	141,999
Enserch Corp.*	9,032	2,481	70	11,583	26	33	59	353,747	968,543	68,551	1,736,266	118,830
Equitable Gas Co.	—	—	—	—	—	—	—	66,592	487,935	41,024	406,254	74,633
Florida Gas Transmission Co.*	4,353	—	—	4,353	21	—	21	205,131	479,729	7,855	778,008	40,317
Freeport Pipeline Co.	—	—	—	—	—	—	—	—	—	—	225	12
Frontier Gas Storage Co.	—	—	—	—	—	—	—	—	—	—	14,271	—
Gas Gathering Corp.	—	—	—	—	—	—	—	—	1,460	8	5,826	321
Gas Transport Inc.	—	—	—	—	—	—	—	—	3,756	72	13,866	1,068
Gasdel Pipeline System Inc.	—	—	—	—	—	—	—	—	11,138	33	4,528	457
Glacier Gas Co.†	—	—	—	—	—	—	—	—	—	—	—	—
Granite State Gas Transmission Inc.	57	—	—	57	1	—	1	31,796	3,201	94	127,596	298
Great Lakes Transmission Co.*	1,306	—	—	1,306	14	—	14	27,746	521,845	3,300	294,407	27,589
Great Plains Natural Gas Co.	—	—	—	—	—	—	—	3,996	12,076	506	20,983	902
Hampshire Gas Co.	—	—	—	—	—	—	—	135	10,551	171	2,653	687
High Island Offshore System*	203	—	—	203	1	—	1	—	354,322	3,561	91,168	8,797
Honeoye Storage Corp.	11	—	18	29	—	3	3	—	8,730	314	2,099	281
Indiana Utilities Inc.	—	—	—	—	—	—	—	—	1,552	127	1,846	100
Inland Gas Co. Inc., The	—	—	—	—	—	—	—	8,454	22,925	258	32,617	448

GAS PIPELINES (Continued)

Company	Miles of pipeline Transmission	Miles of pipeline Field	Miles of pipeline Storage	Miles of pipeline Total	Total compressor stations Transmission	Total compressor stations Other	Total compressor stations Total	Total sales, MMcf	Fiscal data, $1,000 Gas plant	Fiscal data, $1,000 Additions	Fiscal data, $1,000 Operating revenues	Fiscal data, $1,000 Net income
Inter-City Minnesota Pipelines Ltd.	—	—	—	—	—	—	—	10,638	2,827	46	136	-1
Interstate Power Co.	—	—	—	—	—	—	—	28,083	33,464	2,457	318,415	26,056
Iowa Public Service Co.	—	—	—	—	—	—	—	36,354	81,136	4,567	391,039	31,591
Iowa-Illinois Gas and Electric Co.	—	—	—	—	—	—	—	63,542	169,200	4,920	569,036	60,579
Jupiter Energy Corp.	—	—	—	—	—	—	—	—	2,392	—	184	168
KN Energy Inc.*	9,319	2,791	21	12,131	25	64	89	81,443	332,528	16,130	299,216	2,161
Kentucky West Virginia Gas Co.	—	—	—	—	—	—	—	19,495	112,174	4,834	130,986	58,383
Lawrenceburg Gas Transmission Corp.	—	—	—	—	—	—	—	24,326	443	36	87,266	175
Locust Ridge Gas Co.	—	—	—	—	—	—	—	—	2,693	20	4,011	39
Lone Star Gathering Co.	—	—	—	—	—	—	—	—	2,763	51	383	26
Louisiana-Nevada Transit Co.	—	—	—	—	—	—	—	4,086	2,172	100	8,102	488
Marengo Corp.	—	—	—	—	—	—	—	—	48	—	2,902	62
Michigan Consolidated Gas Co.*	2,231	57	112	2,400	67	6	73	373,533	1,320,374	49,283	2,021,922	51,047
Michigan Gas Storage Co.*	543	—	148	691	2	2	4	58,566	53,154	259	247,202	3,408
Michigan Power Co.	—	—	—	—	—	—	—	21,645	47,954	1,718	146,013	4,464
Mid-Louisiana Gas Co.	—	—	—	—	—	—	—	24,676	78,147	4,489	101,481	13,896
Midwestern Gas Transmission Co.*	903	—	12	915	15	2	17	185,786	161,992	4,240	881,118	11,004
MIGC Inc.	—	—	—	—	—	—	—	9,304	11,391	424	41,167	1,370
Mississippi River Transmission Corp.*	1,970	169	74	2,213	—	4	4	159,262	374,172	20,978	677,438	29,909
Montana-Dakota Utilities Co.	3,080	882	151	4,113	26	7	33	40,745	280,082	10,535	357,242	29,822
Mountain Fuel Resources Inc. (absorbed Mountain Fuel Supply Co.)*	1,517	760	53	2,330	11	33	44	33,718	321,688	30,129	162,429	19,036
National Fuel Gas Distribution Corp.	—	337	—	337	—	2	2	156,001	528,844	35,896	947,233	24,524
National Fuel Gas Supply Corp.*	1,429	1,530	442	3,401	24	20	44	176,768	224,514	10,006	737,233	24,242
National Gas Pipeline Co. of America*	10,868	1,658	202	12,728	78	50	128	937,590	2,210,712	126,130	3,231,416	128,020
North Penn Gas Co.	—	—	—	—	—	—	—	18,101	38,163	2,482	85,313	2,041
Northern Border Pipeline Co.*	824	—	—	824	2	—	2	—	1,296,822	2,920	306,796	67,882
Northern Natural Division of HNG Internorth Inc.*	17,649	9,357	206	27,212	62	76	138	622,318	2,791,925	120,672	2,868,377	296,816
Northwest Alaskan Pipeline Co.*	—	—	—	—	—	—	—	160,667	—	—	642,180	140,387
Northwest Central Pipeline Corp.*	5,846	3,740	180	9,766	41	56	97	271,296	585,783	16,315	958,047	52,292
Northwest Pipeline Corp.*	3,514	3,394	7	6,915	29	49	78	271,717	1,240,449	74,789	1,303,279	51,807
O'Fallon Gas Service Co.	—	—	—	—	—	—	—	327	1,676	46	2,566	252
Ohio River Pipeline Corp.	—	—	—	—	—	—	—	—	3,648	10	28,080	-30
Orange & Rockland Utilities Inc.	—	—	—	—	—	—	—	23,845	103,040	5,494	499,486	38,719
Overthrust Pipeline Co.*	89	—	—	89	—	—	—	—	62,750	96	15,683	3,558
Ozark Gas Transmission System	—	—	—	—	—	—	—	—	143,282	2,428	35,756	5,264
Pacific Gas Transmission Co.*	799	41	—	840	12	1	13	231,309	387,244	7,252	1,087,517	28,064
Pacific Interstate Offshore Co.	—	—	—	—	—	—	—	—	12,169	—	62,828	1,188
Pacific Interstate Transmission Co.	—	—	—	—	—	—	—	40,972	58,155	636	275,311	3,328
Pacific Offshore Pipeline Co.	—	—	—	—	—	—	—	3,190	145,988	14,263	42,729	7,345
Panhandle Eastern Pipe Line Co.*	6,803	5,803	109	12,715	68	71	139	419,197	1,482,638	51,293	2,013,726	148,754
Panmark Gas Co. (new)	—	—	—	—	—	—	—	6,998	—	—	21,695	—
Pelican Interstate Gas System (absorbed Tidal Transmission Corp.)	—	—	—	—	—	—	—	—	11,106	11,106	1,833	-3
Pennsylvania & Southern Gas Co.	—	—	—	—	—	—	—	—	15,553	659	33,799	1,301
Penn-York Energy Corp.	—	—	33	33	—	2	2	—	48,905	711	24,104	5,224
Phillips Gas Pipeline Co. (formerly Seaway Pipeline Inc.)	—	—	—	—	—	—	—	—	45,809	2,235	526	-448
Raton Natural Gas Co.	—	—	—	—	—	—	—	—	1,301	—	5,417	73
Ringwood Gathering Co.	—	—	—	—	—	—	—	7,753	10,579	268	17,214	928
Sabine Pipe Line Co.	—	—	—	—	—	—	—	—	24,911	5,796	2,080	175

GAS PIPELINES (Continued)

Company	Miles of pipeline				Total compressor stations			Total sales, MMcf	Fiscal data, $1,000			
	Transmission	Field	Storage	Total	Transmission	Other	Total		Gas plant	Additions	Operating revenues	Net income
Sea Robin Pipeline Co.*	420	—	—	420	2	—	2	153,521	241,450	2,082	441,435	22,846
Shenandoah Gas Co.	—	—	—	—	—	—	—	3,878	12,803	773	22,933	554
South County Gas Co.	—	—	—	—	—	—	—	372	2,831	207	2,902	68
South Georgia Natural Gas Co.	—	—	—	—	—	—	—	24,515	22,367	1,200	103,570	2,118
South Penn Gas Co.	—	—	—	—	—	—	—	456	574	12	2,326	38
Southern Energy Co. (LNG)	—	—	—	—	—	—	—	—	155,203	8	12,828	2,386
Southern Natural Gas Co.*	7,596	140	48	7,784	49	11	60	469,585	1,173,492	61,855	1,992,337	124,549
Southwest Gas Corp.	—	—	—	—	—	—	—	72,646	580,538	145,255	443,689	19,567
Southwest Gas Storage Co.	—	—	—	—	—	—	—	—	68,447	963	20,876	3,960
Southwest Gas Transmission Co.†	—	—	—	—	—	—	—	—	—	—	—	—
Standard Pacific Gas Line Inc.	184	—	—	184	—	—	—	—	24,077	951	1,416	−353
Stingray Pipeline Co.*	341	—	—	341	2	—	2	—	240,022	2,728	46,326	10,213
Superior Offshore Pipeline Co.	—	—	—	—	—	—	—	—	7,326	—	913	222
Tarpon Transmission Co.	40	—	—	40	—	—	—	—	21,045	27	2,479	1,596
TCP Gathering Co.	—	—	—	—	—	—	—	—	1,167	—	210	21
Tenneco Inc.	13,948	31	2	13,981	64	1	65	967,677	3,222,684	132,249	3,714,597	631,322
Texas Eastern Transmission Corp.*	9,566	48	202	9,816	75	22	97	966,280	2,383,979	114,430	3,412,173	316,220
Texas Gas Pipe Line Corp.	—	—	—	—	—	—	—	—	325	—	5,696	85
Texas Gas Transmission Corp.*	5,683	48	217	5,948	29	10	39	544,289	868,913	28,352	2,000,863	109,060
Texas Sea Rim Pipe Line Inc.	29	—	—	29	—	—	—	—	15,226	38	1,789	−1,464
Trailblazer Pipeline Co.	436	—	—	436	—	—	—	—	270,038	350	58,603	9,802
Transcontinental Gas Pipe Line Corp.*	10,076	144	121	10,341	38	33	71	738,340	2,893,388	158,795	3,409,603	141,931
Transco Gas Supply Co.*	—	—	—	—	—	—	—	—	10	—	371,784	4,504
Transwestern Pipeline Co.*	4,434	—	—	4,434	18	—	18	251,066	668,704	24,808	1,043,627	35,472
Trunkline Gas Co.*	3,932	520	25	4,477	21	12	33	275,667	962,957	8,470	1,252,219	41,172
Trunkline LNG Co.	—	—	—	—	—	—	—	3,571	579,232	−170	82,332	2,678
U-T Offshore System*	30	—	—	30	—	—	—	—	63,090	248	12,831	1,391
Union Gas System Inc.	412	9	16	437	2	1	3	11,642	25,817	1,502	49,526	11,667
Union Light, Heat & Power Co., The	—	—	—	—	—	—	—	12,327	57,004	2,404	187,253	4,346
United Cities Gas Co.	—	—	—	—	—	—	—	26,343	94,608	8,777	141,422	2,732
United Gas Pipe Line Co.*	7,324	2,171	28	9,523	32	14	46	555,454	1,090,740	18,938	2,325,603	59,201
Valero Interstate Trans. Co.	—	—	—	—	—	—	—	16,818	12,491	805	79,645	583
Valley Gas Transmissions Inc.	—	—	—	—	—	—	—	10,208	4,983	106	32,430	45
Washington Gas Light Co.	—	—	—	—	—	—	—	105,938	703,098	29,921	762,893	40,782
West Texas Gas Inc. (new)	—	—	—	—	—	—	—	—	18,535	11,069	38,506	840
West Texas Gathering Co.	—	—	—	—	—	—	—	11,359	1,919	73	16,369	31
Western Gas Interstate Co.	—	—	—	—	—	—	—	3,337	8,687	494	15,227	508
Western Transmission Corp.	—	—	—	—	—	—	—	—	4,235	444	2,918	105
Wexpro Co.†	—	—	—	—	—	—	—	—	—	—	—	—
Wyoming Interstate Co. Ltd.*	269	—	—	269	1	—	1	—	176,959	37	35,351	5,653
Zapata Gathering Co.	—	—	—	—	—	—	—	—	346	65	3,450	1,333
Zenith Natural Gas Co.	—	—	—	—	—	—	—	—	573	105	773	12
1984 Totals	**¶187,465**	**¶66,172**	**¶4,742**	**¶258,379**	**1,152**	**898**	**2,050**	**14,171,864**	**47,309,644**	**2,433,582**	**64,006,035**	**4,055,700**
1983 Totals	**203,403**	**75,095**	**6,706**	**285,204**	**1,367**	**1,342**	**2,709**	**14,325,204**	**45,852,046**	**5,447,532**	**66,261,738**	**3,565,771**

Source: U.S. FERC Forms 2 & 2A for major and nonmajor natural gas companies. Classified as major companies, under new FERC reporting classifications for 1984, are companies whose combined gas sold for resale and gas transported or stored for a fee exceeded 50 MMcf at 14.73 psi (60° F.) in each of the 3 previous calendar years. Nonmajors are natural gas pipeline companies not classified as major and having had total gas sales of volume transactions exceeding 200,000 Mcf at 14.73 psi (60° F.) in each of the 3 previous calendar years.

* Major natural gas pipeline companies under FERC Accounting and Reporting Requirements for Natural Gas Companies, para. 20-011, effective 2.12.85. † FERC filings expected for 1985. § Contesting its classification by the FERC as a major. ARKLA Inc. filed only Form 2A for 1984. ¶ Based on FERC Form 2 filings by 62 of 142 reporting natural gas pipeline companies; 42 of the 43 major companies under the FERC's new classification scheme.

Worldwide Report

China remains active as it attempts to boost production from its offshore. Here, a Sun Co. Inc. drilling manager works with Chinese technicians on a drilling rig in the Gulf of Beibu. Chinese production was up slightly during the first 9 months of 1985.

World oil production down 1.7% in 1985

Worldwide crude oil and lease condensate production slipped by 1.7% during 1985 as consumption declined.

In the midst of weak markets and prices, industry was still able to replace 19.5 billion bbl of production, ending up with proved oil reserves fractionally higher than a year ago, according to Oil & Gas Journal's exclusive worldwide survey.

The Organization of Petroleum Exporting Countries absorbed all of the demand decline—and more. Production by some non-OPEC producers—especially developing countries—made substantial gains.

OPEC appeared ready to abandon its longstanding strategy of adjusting production to defend prices and instead to try to regain market share.

Worldwide production in 1985 averaged 53,483,600 b/d. Production outside Communist areas averaged 38,643,600 b/d, down 2% from 1984.

Oil reserves at yearend totaled 700,140,560,000 bbl worldwide, up 0.2% from a year earlier. Non-Communist reserves totaled 618,770,560,000 bbl, up 0.7%.

Gas reserves totaled 3.48 quadrillion cu ft worldwide, up 2.4%, and 1.94 quadrillion cu ft in non-Communist areas, up 1.8%.

Worldwide refining capacity at yearend 1985 totaled 72,273,507 b/cd, including 54,773,507 outside Communist areas. The worldwide total is down 3.5% from the 1984 level, the non-Communist total down 4.6%.

Production

During the first 9 months of 1985, non-Communist crude production averaged 38 million b/d. That compares with 39.4 million b/d during the first 3 quarters of 1984.

The decline in total non-Communist demand for crude coincided with a further increase in output outside OPEC. Non-OPEC production averaged 21.8 million b/d during 1984 and increased during the first 9 months of 1985.

At the end of the first quarter, non-OPEC production had risen to 22.5 million b/d. It topped 22.4 million b/d in the second quarter and 22.5 million b/d in the third quarter. Preliminary estimates for the final 3 months are 23.4 million b/d, which gives an average for the year of 22.7 million b/d.

Non-OPEC producers with the most significant production gains were Denmark, France, Colombia, Brazil, Angola, Pakistan, and Thailand.

Colombia's increase followed accelerated development of several major discoveries, especially the Cano Limon find.

Brazil has steadily surpassed its production targets with the help of rising output from Campos basin. And French production gains came mainly from new fields in the Paris basin.

This rising non-OPEC production at a time of declining demand for non-Communist oil has put tremendous pressure on the 13 members of OPEC.

OPEC production averaged 17.3 million b/d in 1983, 17.4 million b/d in 1984, and an estimated 15.9 million b/d in 1985, far below the peak 31.3 million b/d of 1977.

OPEC members, hoping 1984 was the low point, were disappointed. The group's production averaged 16.6 million b/d in the first quarter of 1985, 15.2 million b/d in the second quarter, and 14.9 million b/d in the third quarter, for a 9 month average of 15.6 million b/d. In the same period of 1984, OPEC production averaged 17.7 million b/d.

At the heart of OPEC's problems is the lack of sustained recovery in demand for crude in the non-Communist world. The International Energy Agency estimates total consumption in 1985 will average 45.6 million b/d—down from 46.1 million b/d during 1984.

OPEC has not been helped by the midyear recovery of net exports from Communist producers during 1985. At the beginning of 1985, exports from this source slumped from the normal 1.8-2 million b/d to less than 1 million b/d.

However, in the second and third quarters, deliveries jumped to more than 2 million b/d, and it appears likely that the average for the year will be 1.7 million b/d, just below the average for the past 2 years.

Communist exports are dominated by the Soviet Union, where the state-controlled industry is having trouble maintaining production at target levels. Soviet authorities set a production target for 1985 of 12.56 million b/d. After 9 months, output averaged only 11.9 million b/d.

In China, production increased to 2.474 million b/d during the first 9 months from 2.25 million b/d during the same period of 1984.

OPEC difficulties. Although non-Communist demand for oil fell throughout the first 9 months of 1985, most OPEC members were able to produce in excess of their official quotas thanks to Saudi Arabia's policy of observing official selling prices and reducing production.

Saudi Arabia has a nominal production ceiling of 4.353 million b/d out of the organization's total limit on production of 16 million b/d. Saudi production averaged only 3 million b/d during the first 9 months of 1985, plus 184,000 b/d from the Neutral Zone.

As customers walked away in the face of more competitive crude prices from other OPEC members, Saudi production fell, hitting a low of 2.2 million b/d in August. Since then, the Saudis have moved to netback pricing, and output has climbed to more than 4 million b/d.

The rise of Saudi production under the netback regime coincided with rising exports from Iraq, which opened a new pipeline link to the Saudi port of Yanbu on the Red Sea coast at the end of the summer.

Production jumped from the official quota of 1.2 million b/d in early summer to 1.6 million b/d at the end of October. Output is still rising as heavy discounts offered to Japanese crude buyers at Yanbu attract more customers.

Iran, the other major producer in the Persian Gulf, has maintained its output at more than the 2.3 million b/d ceiling despite Iraq's repeated air raids on Kharg Island terminal. Damage to various berths was extensive, and Iranian flow dipped to 1.9 million b/d during September. Generally, though, the Iranians have managed to turn around enough shuttle tankers to ensure the continued operation of the transshipment point off Sirri island, where most export cargoes are loaded.

Kuwait's production averaged 828,000 b/d during the first 9 months, plus 184,000 b/d from the Neutral Zone. Qatar's 280,000 b/d ceiling has been exceeded for most of the year, averaging 296,000 b/d for the first 9 months. The United Arab Emirates topped its 950,000 b/d quota by 150,000 b/d.

In Africa, Algeria is the only OPEC member to stay close to its official quota. Output during 1985 was about 643,000 b/d, compared with the official quota of 663,000 b/d. Neighboring Libya produced about 45,000 b/d more than its 990,000 b/d quota.

Nigerian output was the most volatile, peaking at 1.7 million b/d in March (quota 1.3 million b/d) and falling back for an average of only 1.3 million b/d in the third quarter. Gabon was also ahead of its 137,000 b/d quota throughout the year.

Outside the Middle East and North Africa, Venezuela produced an average 1.668 million b/d during the first 9 months, 113,000 b/d above quota. Indonesian flow averaged 1.212 million b/d.

Ecuador proved the most blatant quota-buster of all, averaging 272,000 b/d. Its official ceiling: 180,000 b/d.

Non-OPEC production. While OPEC members have tended to see North Sea producers as the architects of their current misfortunes, there have been production increases throughout the non-Communist world. North Sea production is heading for a peak of 3.7 million b/d this winter. U.K. output peaked at 2.7

million b/d in January and, after declining during the summer maintenance turnarounds, is again heading for these high levels.

Big strides in production have been made in Norway. During the first half of 1985 output was fairly steady at about 750,000 b/d. But at the end of June the third platform on prolific Statfjord field began production.

As output from the C platform has increased, Statfjord has produced about 700,000 b/d. With 16% of Statfjord flow attributable to the U.K., Norwegian production has been pushed to more than 850,000 b/d and should come close to 900,000 b/d at times during the remainder of the winter.

Holland and Denmark, small producers in the North Sea, are scheduled to make small increases in output.

Most non-OPEC production still comes from North America. U.S. production averaged 8.89 million b/d during the first 9 months of 1985, compared with 8.83 million b/d in 1984. Mexican output dropped to 2.726 million b/d from 2.753 million b/d a year earlier. Canadian production increased to 1.454 million b/d from 1.428 million b/d.

Developing countries. Output gains have been impressive among nonindustrialized countries.

In 1979, before the last round of major price increases, nonindustrialized producers flowed 5.3 million b/d. During 1984 the average was 8 million b/d. For the first 3 quarters of 1985 production from this sector averaged just less than 8.5 million b/d.

Important members of this group are Oman and Egypt. In Oman, output climbed from slightly more than 400,000 b/d in the first half of 1984 to about 500,000 b/d in 1985. Productive capacity was raised to 650,000 b/d following expansion of the country's main pipeline network. Oman says it will not increase output to more than 500,000 b/d, as a gesture of solidarity with OPEC.

Egypt is still pressing toward its goal of 1 million b/d of crude and condensate and has pushed output to 900,000 b/d, mainly through increases in the Gulf of Suez.

Elsewhere in Africa, Angolan production has increased from 205,000 b/d in 1984 to a 223,000 b/d average for the first 9 months of 1985. Elf Angola has placed Palanca field on stream, which contributed to the rise, and plans to start up two other fields during the next 2 years.

In South America, Colombia and Brazil achieved significant production gains. Colombian production rose to 178,000 b/d from 166,000 b/d, and Brazil pushed output to 537,000 b/d from 454,000 b/d. Output is expected to continue to rise in both countries.

And in the Asia-Pacific region, production was up in Australia, India, Japan, New Zealand, Pakistan, and Thailand. The biggest increases came in Pakistan, where production rose to 33,000 b/d from 15,000 b/d.

Reserves

Reserves changes were mixed.

Here's a region by region summary:

- In the Asia-Pacific region, oil reserves climbed 1.8%, while gas reserves increased 3.2%. Countries with oil and gas reserves increases included Australia, Brunei, India, Japan, and New Zealand. Pakistani and Malaysian oil reserves rose, but gas reserves declined. Indonesia, Thailand, and Taiwan had declines in oil and gas reserves.

- Oil reserves in the Middle East were unchanged, while gas reserves dropped 1.6%. Iran, Iraq, Kuwait, Bahrain, the Neutral Zone, Qatar, Saudi Arabia, and Syria all had reserves declines in oil and gas. Dubai's gas reserves were up slightly. Sharjah's oil and gas reserves rose significantly, mainly due to Amoco Corp.'s extension of Sajaa field about 20 miles from the coast. Oman's oil reserves were up on the strength of discoveries in the southern area and some in the north central area.

- Africa's oil and gas reserves rose, with oil up 2% and gas up 6%. There were significant increases in oil and gas reserves in Angola, Congo Republic, Libya, and Tunisia. Egypt and the Ivory Coast also sharply boosted their oil reserves.

- Western Europe's oil reserves climbed 8%, and gas reserves rose 9.5%, led by Norway's significant deepwater finds north of the 62nd parallel. France also had significant gains in oil and gas reserves, due mostly to discoveries in the Paris basin, as did Denmark. Oil reserves dropped, and gas reserves rose for the U.K., West Germany, and Italy. Oil and gas reserves in Greece, Austria, and the Netherlands declined.

- In the Western Hemisphere, oil reserves gained 0.9%, while gas reserves advanced 2.3%. Several countries made significant gains in oil and gas reserves, including Colombia, Brazil, and Ecuador. Chile and Peru were down in oil and gas reserves. Mexico and Argentina reported increases in oil reserves, while gas reserves dropped. Canadian oil reserves, with frontier revisions, were down; gas reserves climbed.

- In Communist areas, total oil reserves fell 1%, while gas reserves increased 1%.

Refining

Changes in non-Communist refining capacity reflect efforts to accommodate operations to continued sluggish demand and the need for more flexibility.

For the fourth consecutive year, total crude capacity outside the U.S. dropped during 1985—by 5.7% to 39,591,507 b/cd.

Vacuum distillation capacity dropped as well, from 11,116,369 b/d to 11,043,161 b/d. Hydrocracking capacity increased by 22% to 966,908 b/d due to the addition of 71,000 b/d in Saudi Arabia. Fluid catalytic cracking capacity increased by 1% to 4,108,267 b/cd.

Here's a region by region breakout of refining capacity changes:

- Asia-Pacific, down 2.7% to 10,111,652 b/d. Despite increases by six states, big drops in Singapore, Japan, and Australia accounted for much of the decline. Weak throughput in Singapore and moves to open Japanese markets to foreign products are expected to result in further cuts in 1986.

- Western Europe, down 10.1% to 14,071,507 b/d. Big drops were registered in the U.K., France, Italy, Spain, and West Germany.

- Middle East, up 5.47% to 4,274,255 b/d, the first wave of nearly 1 million b/d of export capacity being installed by exporting nations. Barring military conflicts, this region's capacity will increase steadily for at least the next 2 years.

- Africa, up 2.99% to 2,520,403 b/d, largely on the strength of Egyptian expansions.

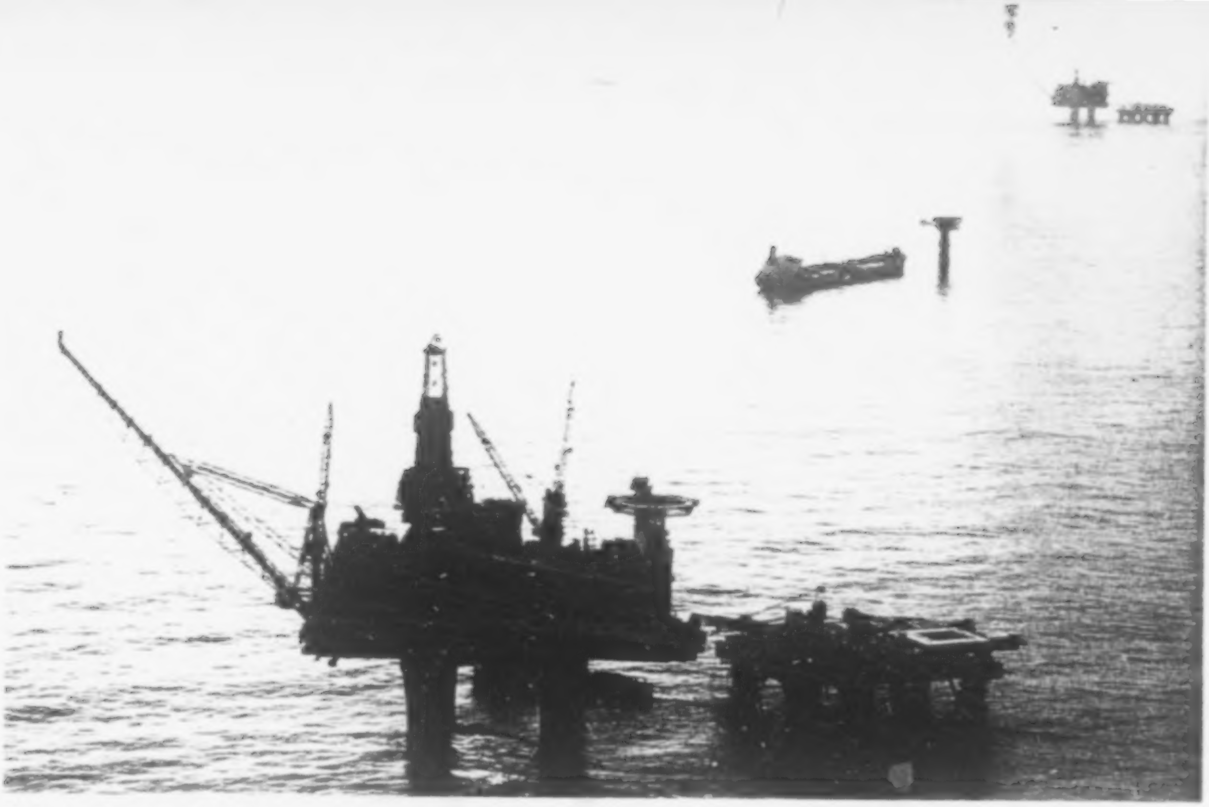
- Western Hemisphere, down 4.3% to 23,795,690 b/d behind reductions and closures of Caribbean basin plants.

Pacific basin cuts. Asia-Pacific capacity has fallen victim to changing demand patterns. Fuel oil demand, once the mainstay of Singapore's huge refining industry, has fallen as regional consumers switched to other fuels.

Singapore's lack of flexibility left the island's refiners scrambling for term and spot processing deals (OGJ, Nov. 18, p. 57).

Indonesia sharply reduced the amount of crude it shipped to Singapore for processing as its new, highly efficient capacity began coming on stream.

Japanese refiners have been cutting old, unprofitable capacity and likely will continue as the nation allows greater product imports under pressure from IEA. In second half 1985 Japan's Ministry of International Trade and its petroleum council pushed the Diet and Cabinet to approve a mea



Start-up of the Statfjord C platform, foreground, in the North Sea gave a boost to Norwegian production during 1985. Other equipment shown is the loading facility, the A platform in the right corner, and the B platform in the distance.

sure allowing refiners to import products, not just crude.

The ministry's goal is a capacity reduction of 1 million b/d by spring 1989. The effort is being resisted by the refining industry.

European capacity falls. During 1985, many of the world's largest refiners reduced operations in western Europe. Exxon Corp., British Petroleum plc, Agip Petroli SpA, Royal Dutch/Shell Group, and Spain's state-owned Instituto Nacional de Hidrocarburos all closed refineries or otherwise reduced capacity.

Western Europe's capacity utilization rate was less than 70% for most of 1985, a function of reduced oil demand and competition from the Middle East and eastern Europe.

The biggest cuts came in France, West Germany, Italy, and Germany.

Despite the capacity reductions, European refiners made upgrading investments in several countries.

Shell Nederland Raffinaderij BV's 416,000 b/d Pernis, Netherlands, refinery, for example, is being upgraded.

The project, to be complete by mid-1988, is part of a $700 million effort to improve the plant.

Greece's Hellenic Aspropyrgos Refinery SA began installing downstream units to produce more gasoline and octanes and to charge heavier crudes.

Like Japan, Spain is reducing and upgrading capacity. Petroleos del Norte SA completed a $300 million revamp of its 240,000 b/d Somorrostro, Bilbao, refinery (OGJ, Sept. 9, p. 72). Meantime, Empresa Nacional del Petroleo SA plans to cut capacity at its 180,000 b/cd Cartagena refinery by 50% (OGJ, Dec. 9, p. 36).

The outlook

The outlook is for more of the same: sluggish demand, restricting production and encouraging reductions of older, less-efficient refining capacity.

IEA estimates that non-Communist demand for petroleum products during the first quarter of 1986 will be only 47 million b/d, compared with 47.1 million b/d in the same period of 1984. And it sees even less demand the rest of the year.

Consumption in 1986 is expected to drop to an average of 45.4 million b/d from the 45.6 million b/d forecast for 1985.

Consumption in North America is expected to be static. There will be small declines in the main industrial countries of the Pacific and Europe. The only increase in consumption is expected among countries outside the Organisation for Economic Cooperation and Development (OECD), and this will amount to only 100,000 b/d of increase from the 1985 level of 11.6 million b/d.

OPEC early in December was on the point of abandoning its role as the world's swing producer. It was planning to discard the system of production quotas and carve out what it considered a fair share of the world market—a move that would aggravate price weakness expected during the spring 1986 demand slump.

The organization's spring production target appeared to be at least 18 million b/d, which would accommodate rising output from Saudi Arabia and Iraq and small increases by other members.

OPEC earlier declared that a sharp oil price drop this spring could be avoided only if nonmembers joined the organization in restraining production. ∎

Worldwide oil and gas at a glance

COUNTRY	ESTIMATED PROVED RESERVES 1-1-1986		OIL PRODUCTION			REFINING Capacity (b/cd) Jan. 1, 1986				
	Oil (1,000 bbl)	Gas (10^9 cu ft)	Producing wells** July 1, 85	Estimated 1985 (1,000 b/d)	% change from 1984	No. of ref.	Crude	Thermal operations	Catalytic cracking	Catalytic reforming
ASIA-PACIFIC										
Australia	1,449,000	18,220	746	556.0	+13.0	11	622,610	...	178,800	157,220
Bangladesh	...	11,800	...	...	...	1	31,200	...	...	1,650
Brunei	1,480,000	7,400	629	149.5	−6.6	1	10,000	...	...	...
Burma	65,500	160	445	30.0	...	2	26,300	1,700	...	...
China, Taiwan	(c)5,500	811	84	2.7	+3.8	2	542,500	3,933	22,600	51,960
India	3,736,000	16,880	2,201	614.0	+16.1	12	866,682	104,730	104,070	28,490
Indonesia	8,500,000	35,600	5,378	1,219.5	−14.3	6	635,800	81,500	...	60,700
Japan	62,000	1,100	256	10.0	+25.0	44	4,613,400	80,520	472,750	543,950
Korea, South	...	...	...	...	...	6	782,000	42,990	...	59,454
Malaysia	3,100,000	52,700	370	432.8	−0.1	4	212,300	...	...	20,900
New Zealand	(c)176,000	5,515	28	18.0	+5.9	1	53,000	...	...	18,000
Okinawa	...	...	...	...	...	3	110,000	...	...	7,400
Pakistan	109,000	15,400	51	34.3	+101.8	3	130,000	...	...	5,750
Papua New Guinea	(c)50,000	500	...	...	...	...	...	...	...	...
Philippines	16,300	11	9	9.3	−19.1	3	216,000	...	23,100	33,400
Singapore	...	...	...	...	...	5	1,018,000	133,000	...	49,600
Sri Lanka	...	...	...	...	...	1	50,000	12,500	...	3,750
Thailand	107,000	5,400	184	34.3	+90.6	3	191,860	9,600	9,250	25,300
Total Asia-Pacific	**18,856,300**	**171,497**	**10,381**	**3,110.4**	**− 0.8**	**108**	**10,111,652**	**470,473**	**810,570**	**1,067,524**
WESTERN EUROPE										
Austria	110,000	520	1,605	21.7	−5.7	1	204,000	17,000	24,000	31,000
Belgium	...	...	...	...	...	4	652,100	65,500	100,500	78,200
Cyprus	...	...	...	...	...	1	16,000	...	...	3,400
Denmark	465,000	3,900	NA	58.0	+23.4	3	166,000	72,800	...	29,100
Finland	...	...	...	...	...	2	241,000	46,300	41,800	55,100
France	230,000	1,400	601	49.0	+40.0	16	1,946,850	145,200	258,300	271,100
Germany, West	292,000	6,424	3,152	80.5	+1.9	22	1,932,800	282,400	183,200	355,500
Greece	34,600	3,000	15	26.4	−2.2	4	390,000	19,520	23,000	31,200
Ireland	...	900	...	...	...	1	56,000	...	...	11,000
Italy-Sicily	740,000	5,000	195	41.7	−7.3	21	2,738,100	306,630	273,500	311,800
Netherlands	251,000	67,070	644	69.0	+13.1	7	1,468,350	120,010	122,500	148,400
Norway	10,900,000	104,000	178	771.0	+10.6	3	240,000	90,500	...	29,150
Portugal	...	...	...	...	...	3	295,607	...	10,141	35,909
Spain	90,000	700	43	45.3	−1.5	10	1,367,000	124,000	87,500	193,100
Sweden	...	...	...	...	...	6	429,000	72,444	26,666	74,588
Switzerland	...	3	...	...	...	2	137,000	24,000	...	25,000
Turkey	300,000	490	449	41.5	+1.2	4	460,475	...	38,600	45,057
United Kingdom	13,000,000	33,000	627	2,519.8	+1.0	15	1,791,700	166,000	363,500	368,500
Total Western Europe	**26,412,600**	**226,407**	**7,509**	**3,723.9**	**+ 3.6**	**125**	**14,531,982**	**1,552,304**	**1,553,207**	**2,097,104**
MIDDLE EAST										
Abu Dhabi	31,000,000	20,500	254	705.1	−10.0	3	185,250	...	...	29,569
Bahrain	155,000	7,103	271	41.9	+2.2	1	250,000	19,000	36,000	17,100
Dubai	1,400,000	4,400	152	348.0	+2.5	...	...	...	...	...
Iran	47,876,000	470,000	361	2,279.0	+4.8	4	530,000	80,800	...	63,845
Iraq	44,110,000	29,000	NA	1,396.8	+15.4	8	318,500	...	...	43,500
Israel	710	10	9	0.1	...	2	170,000	62,000	18,000	24,500
Jordan	...	...	...	...	...	1	100,000	...	4,410	8,640
Kuwait	89,774,000	32,500	572	823.3	−12.1	5	633,600	...	...	51,000
Lebanon	...	...	...	...	...	2	17,000	...	...	3,100
Neutral Zone	5,380,000	8,210	493	357.8	−18.5	...	...	...	...	...
North Yemen	200,000	...	...	...	...	...	...	...	...	...
Oman	4,000,000	6,000	641	484.3	+16.7	1	48,082	...	...	9,644
Qatar	3,300,000	148,000	174	297.0	−25.0	1	56,058	...	...	10,463
Ras Al Khaimah	100,000	400	4	9.1	+56.9	...	...	...	...	...
Saudi Arabia	168,800,000	121,000	NA	3,295.3	−26.2	5	1,115,000	30,000	10,000	87,900
Sharjah	490,000	7,500	19	66.1	−6.1	...	...	...	...	...
South Yemen (Aden)	...	...	...	...	...	1	161,500	...	...	10,800
Syria	1,440,000	1,240	847	161.7	−4.9	2	228,790	41,199	...	19,348
Total Middle East	**398,025,710**	**855,863**	**3,797**	**10,265.5**	**−10.3**	**36**	**3,813,780**	**232,999**	**68,410**	**379,409**

EDITOR'S NOTE: All reserves figures except those for the U.S.S.R. (and gas for Canada) are reported as proved reserves recoverable with present technology and prices. U.S.S.R. figures are "explored reserves" which include proved, probable, and some possible. Canadian gas figure, under criteria adopted by Canadian Petroleum Association in 1980, includes proved and some probable. (c)Condensate. *U.S. reserves numbers based on Energy Information Administration estimates which ran some 3 billion bbl and 11 trillion cu ft higher than API/AGA estimates for 1979, the last year the latter two associations provided estimates. †Estimates based on capacity as of Jan. 1, 1985, plus known 1985 closures and expansions. ††Includes Albania, Bulgaria, Cuba, Czechoslovakia, East Germany, Hungary, Mongolia, North Korea, Poland, Rumania, Viet Nam, and Yugoslavia. **Does not include shut in, injection, or service wells.

COUNTRY	ESTIMATED PROVED RESERVES 1-1-1986 Oil (1,000 bbl)	Gas (10⁹ cu ft)	OIL PRODUCTION Producing wells** July 1, 85	Estimated 1985 (1,000 b/d)	% change from 1984	REFINING Capacity (b/cd) Jan. 1, 1986 No. of ref.	Crude	Thermal operations	Catalytic cracking	Catalytic reforming
AFRICA										
[illegible]	8,820,000	107,080	NA	643.3	+ 5.8	4	464,700	...	...	55,600
Angola-Cabinda	2,000,000	1,870	298	228.5	+ 9.9	1	32,100	...	...	1,900
Benin	100,000	...	6	6.9	...	...	...	...	...	...
Cameroon	555,000	3,880	173	133.5	+ 6.8	1	43,000	...	...	6,500
Congo	650,000	2,470	272	115.1	- 2.3	1	21,000	...	...	2,000
Egypt	3,850,000	7,060	658	885.8	+ 7.1	6	434,150	16,470	...	30,870
Ethiopia	...	...	...	...	...	1	18,000	...	...	2,200
Gabon	520,000	420	297	150.0	...	1	23,000	7,200	...	1,400
Ghana	3,800	4	3	2.0	...	1	28,000	...	...	5,550
Ivory Coast	125,000	2,118	20	28.0	+ 3.7	2	90,000	...	...	14,600
Kenya	...	...	...	...	...	1	95,000	...	...	9,000
Liberia	...	...	...	...	...	1	15,000	...	...	2,000
Libya	21,300,000	21,390	671	1,045.3	- 4.2	3	329,800	...	...	14,182
Madagascar	...	...	...	...	...	1	16,350	...	...	2,600
Morocco	250	...	...	...	...	2	81,303	...	5,600	13,735
Mozambique	...	...	...	...	...	1	17,000	...	...	2,500
Nigeria	16,600,000	47,000	1,153	1,445.5	+ 2.2	3	250,400	...	44,100	38,100
Senegal	...	...	...	...	...	1	29,800	...	...	2,870
Sierra Leone	...	...	...	...	...	1	10,000	...	...	...
Somalia	...	...	...	...	...	1	10,000	...	...	...
South Africa	...	...	...	...	...	5	388,500	59,500	80,000	62,500
Sudan	300,000	...	...	...	...	1	23,800	...	...	1,700
Tanzania	...	800	...	...	...	1	13,500	...	...	3,000
Togo	...	...	...	...	...	1	20,000	...	...	4,400
Tunisia	1,800,000	4,200	140	125.0	+ 4.2	1	34,000	...	...	3,300
Zaire	110,000	30	17	30.5	+ 13.0	1	17,000	...	...	3,000
Zambia	...	...	...	...	...	1	25,000	...	...	5,600
Total Africa	**56,734,050**	**198,322**	**3,708**	**4,839.4**	**+ 2.4**	**44**	**2,530,403**	**83,170**	**129,700**	**289,107**
WESTERN HEMISPHERE										
Argentina	2,300,000	23,588	8,581	447.5	- 4.0	11	667,200	124,800	105,850	38,300
Barbados	400	...	73	1.9	+ 11.8	1	3,000	...	...	...
Bolivia	154,000	4,700	346	20.0	...	3	46,930	...	...	14,158
Brazil	2,070,000	3,060	3,514	540.5	+ 16.2	13	1,305,100	19,900	321,900	21,600
Canada	6,500,000	99,700	43,480	1,453.0	+ 1.3	28	1,855,800	74,160	377,000	352,700
Chile	726,000	2,300	266	32.5	- 14.5	2	141,000	8,400	34,000	5,300
Colombia	1,224,000	4,130	2,709	178.8	+ 6.4	4	211,000	61,000	91,000	6,000
Costa Rica	...	...	...	...	...	1	15,200	...	...	1,300
Dominican Republic	...	...	...	...	...	2	44,000	...	...	8,300
Ecuador	1,650,000	4,090	816	273.3	+ 5.9	3	87,600	12,600	12,600	2,780
El Salvador	...	...	...	...	...	1	16,300	...	...	2,800
Guatemala	50,000	30	8	3.1	- 38.0	1	16,000	...	...	3,000
Honduras	...	...	...	...	...	1	14,000	...	...	1,800
Jamaica	...	...	...	...	...	1	35,500	...	...	3,540
Martinique	...	...	...	...	...	1	12,800	...	...	3,000
Mexico	49,300,000	76,954	3,209	2,797.0	- 1.7	9	1,269,000	82,000	297,000	163,800
Netherlands Antilles	...	...	...	...	...	1	320,000	67,000	42,000	15,000
Nicaragua	...	...	...	...	...	1	14,500	...	...	2,800
Panama	...	...	...	...	...	1	100,000	...	...	7,500
Paraguay	...	...	...	...	...	1	7,500	...	...	...
Peru	636,000	852	3,572	189.0	+ 2.7	6	175,560	...	21,670	1,680
Puerto Rico	...	...	...	...	...	2	121,000	...	12,000	5,800
Suriname	1,000	...	23	1.0	+ 25.0	...	...	...	...	...
Trinidad & Tobago	540,000	10,500	3,157	179.0	+ 5.3	2	260,000	18,000	25,000	29,000
Uruguay	...	...	...	...	...	1	45,000	...	5,000	3,000
Venezuela	25,591,000	59,067	10,103	1,669.0	- 2.5	7	1,229,700	122,000	179,400	6,000
Virgin Islands	...	...	...	...	...	1	600,000	40,000	...	125,000
United States	*28,000,000	*197,000	642,000	8,919.0	+ 0.5	†191	†15,182,000	†1,810,100	†5,165,000	†3,671,000
Total Western Hemisphere	**118,742,400**	**485,971**	**721,857**	**16,704.6**	**+ 0.9**	**296**	**23,795,690**	**2,439,960**	**6,689,420**	**4,495,158**
Total non-Communist	**618,771,060**	**1,938,060**	**747,252**	**38,643.8**	**- 2.0**	**609**	**54,783,507**	**4,778,906**	**9,251,307**	**8,328,302**
COMMUNIST AREAS										
China	18,420,000	30,000	NA	2,474.0	+ 9.0	20	2,150,000	NA	NA	NA
U.S.S.R.	61,000,000	1,500,000	121,000	11,905.0	- 2.6	38	12,200,000	NA	NA	NA
Other††	1,950,000	16,000	NA	461.0	- 5.1	45	3,150,000	NA	NA	NA
Total Communist	**81,370,000**	**1,546,000**	**121,000**	**14,840.0**	**-1.0**	**103**	**17,500,000**	**NA**	**NA**	**NA**
TOTAL WORLD	**700,141,060**	**3,484,060**	**868,252**	**53,483.8**	**-1.7**	**712**	**72,283,507**	...	...	...

Worldwide Production

- Offshore (e) Estimated (c) Condensate (NA) Not available

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
ABU DHABI	**AMERADA GROUP**	• Arzanah, 1973	11,000-11,300						42.0
	CFP GROUP	• Abu Al Bukhoosh, 1969	8,900-10,900						32.0
		• Mubarras, 1969	8,300-10,000						37.0
		• El Bunduq, 1964	9,400-10,900						40.0
	ADNOC	Asab, 1965	8,000- 8,700						41.0
		Bab, 1958	8,600- 9,300	349	43	349	705,146	7,532,426,446	44.0
		Bu-Hasa, 1962	8,300- 9,200						39.0
		Sahil, 1967	9,500- 9,800						41.0
		• Umm Shaif, 1958	9,800-12,000						37.0
		• Upper Zakum, 1964	9,150						39.0
		• Lower Zakum, 1964	9,100						39.0
		Zakum, 1963	9,600-12,000						40.0
		Total Abu Dhabi		**349**	**43**	**349**	**705,146**	**7,532,426,446**	
ALGERIA(e)	**SONATRACH**	Zarzaitine, 1957	4,700						42.2
		Edjeleh, 1956	1,500- 2,800						37.2
		Tiguentourine, 1966	2,160- 4,265						44.4
		El Adeb Larache, 1958	4,100						43.3
		Assakaifaf N. & S., 1958	2,800						42.7
		Tan Emellel N. & S., 1960	2,800- 4,500						42.5
		Edeyen, 1964	5,580						41.5
		Hassi Mazoula S., 1963	4,430						40.2
		Hassi Mazoula B., 1965	4,920						42.0
		Acheb W. & Kreb, 1963 & 1960	7,360						45.6
		Tin Fouye N., + F6, 1962	4,265						39.6
		El Borma, 1967	8,200						42.9
		Keskassa, 1968	8,860						42.9
		Mereksen, 1974	9,420						45.8
		Gara, 1962	9,420						42.9
		Hassi Messaoud N., 1956	13,500						45.9
		Hassi Messaoud S., 1956	10,500						46.1
		Gassi-Touil & Gassi-Touil E., 1961	6,890						50.6-50.8
		Hassi Chergui	8,200						50.6
		Nezla N., 1965	8,530						51.5
		Rhourde El Baguel, 1962	9,850						40.2
		Mesdar E. & W., 1972	11,155						40.3
		El Gassi-El Agreb, 1959	10,170	NA	NA	NA	647,000	6,953,700,000	47.9
		Rhourde Nouss & E., 1972	8,530						39.7
		Tin Fouye Tabankort, 1966	4,600- 6,560						41.1-41.3
		Djoua W., 1967	5,580- 6,240						41.1
		Amassak, 1970	6,565						41.1
		Tamendjelt, 1970	5,585- 6,890						41.1
		Timedratine, 1964	8,155						42.7
		Ohanet N. & S., 1960	7,878						43.8
		Askarene, 1962	8,200						41.7
		Guelta, 1962	8,960						41.7
		Stah, 1971	9,515						45.8
		Ras Toumb, 1976	9,190						35.7
		Haoud Berkaoui-Ben Kahla, 1965	11,000						43.6
		Guellala-Guellala N.E., 1969	11,320						42.2-42.3
		N'Goussa, 1974	11,715						42.2
		Kef El Argoub, 1973	12,570						42.2
		Oued Noumer, 1969	8,860						48.3
		Djorf, 1974	9,025						48.3
		Djebel Onk, 1960	3,940						37.0
		Alrar FJT							
		Hassi R'Mel(c)							
		Gassi Touil(c)							
		Other: Crude							
		Condensate							
		Total Algeria		**NA**	**NA**	**NA**	**647,000**	**6,953,700,000**	
ANGOLA	**FINA ANGOLA(e)**	Garda, 1975	5,010	2					36.1
		N'Z Kitona S & D, 1973	5,200- 5,670	5		1			30.4
		N'Z Pangala, 1973	4,997- 5,095	5	2	1			36.1
		N'Zombo, SW I, SW S. & SE S., 1973	5,245- 6,270	5		1			30.2-31.0
		Quenguela N., 1967	4,900- 6,200	1	21	18	36,235	211,433,200	31.1
		Quinfuquena I & S, 1975	6,800- 7,050	8		4			31.4-32.0

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	Quinguila, 1972	4,100	3	8	1			36.2
	Bento, 1972	7,500	1		1			26.0
	Cabeca da Cobra, 1969	3,400	4		2			41.1
	Pambo, 1982	4,600	4		1			38.8
	Luango, 1977	3,800	3					38.0
	Other	3,400- 6,500	12	4	36			27.5-37.4
GULF CABINDA	• Erva, 1969	10,650	1			323	3,909,043	30.2
	• Kambala, 1971	11,100	2	3		6,328	10,995,803	32.8
	• Kungulo, 1976	3,900	10	7		15,296	32,123,942	32.2
	• Limba, 1969	2,900- 8,750	4	2	3	16,353	74,517,206	31.6
	• Livuite, 1979	8,200	5	1	1	1,422	1,874,293	31.7
	• Malongo N., 1966	1,500- 8,500	5	54	10	15,805	197,703,787	29.6
	• Malongo S., 1966	1,300- 1,600	2	26	4	9,102	64,747,082	25.1
	• Malongo W., 1969	1,800- 6,900	5	14	16	10,985	214,387,587	22.5
	• Takula, 1982	4,000- 6,350	41	5	3	84,905	56,251,491	31.5
TEXACO	• Curtala, 1978	7,000- 7,500		1		100	2,020,000	34.0
	• Essungo, 1975	6,500- 6,750	10			7,500	14,124,000	37.0
ELF-MOBIL-AGIP-NAFTAGAS-INA NAFTAPLIN	Palanca, 1981	8,700	7			16,541	2,084,119	39.6
	Total Angola		145	153	106	223,525	885,898,553	
ARGENTINA	Chubut, 1907	1,968- 9,168	65	2,100	83	90,794	919,502,312	21.1-26.0
	Jujuy, 1969	2,461-16,732	9		1	1,500	59,779,080	46.5-47.0
	La Pampa, 1968	3,609- 4,921	4	182	1	7,987	67,280,749	31.0
	Mendoza, 1932	2,178-16,778	34	1,091	16	99,637	985,346,689	23.7-32.0
	Neuquen, 1918	1,312-12,498	174	759	42	65,811	425,616,125	24.0-41.0
	Rio Negro, 1960	2,953- 7,546	65	775	20	43,438	402,256,968	22.5-41.0
	Salta, 1928	6,551-15,092	36	12	8	11,001	109,320,149	39.0-59.0
	Santa Cruz, 1946	1,468-17,060	121	2,962	93	100,442	897,244,226	21.1-30.0
	Tierra del Fuego, 1959	5,249- 7,824	91	99	10	23,981	135,382,913	43.4-46.0
	Formosa, 1984	11,466-11,490	1	1	1	3,287	1,142,112	42.0-42.9
	Total Argentina		600	7,981	275	447,878	4,002,870,323	
AUSTRALIA ESSO-BHP	• Barracouta, 1968	4,550		3		4,421	29,512,281	62.8
	• Cobia, 1972	7,700	8		5	43,371	26,034,836	44.6
	• Halibut, 1967	7,700	11		8	83,215	622,714,266	43.3
	• Kingfish, 1967	7,500	7	20	15	69,574	890,881,236	46.9
	• Mackerel, 1969	7,700	10	6	2	106,588	262,518,093	45.6
	• Tuna, 1968	6,500	19		6	10,498	25,968,082	40.5
	• Snapper, 1968	4,350	5	12	1	4,453	6,629,877	47.0
	• Marlin, 1966	5,100		1	3	8,698	45,498,879	50.0
	• W. Kingfish, 1968	7,500	17		2	40,601	24,406,612	46.9
	• Fortescue, 1978	7,700	15		5	95,784	57,015,472	43.0
	• Flounder, 1968	8,200	6			6,926	1,262,834	46.7
MOONIE	Alton, 1964	6,000		5	2	37	1,864,821	50.5
	Bennett	5,960	1			5	111,014	45.0
	Cabawin, 1961	5,800	1			13	51,749	49.0
	Moonie, 1961	5,800		14	18	563	21,066,987	44.5
	Mereenie, 1964	3,983	13		15	1,761	506,000	50.0
WAPET GROUP	Barrow Island, 1964	1,200-6,700	6	373	NA	20,200	207,496,000	37.0
HARTOGEN GROUP	Borah Creek, 1982	4,860			2	11	8,265	38.0
	Kincora, 1980	4,850	5	2	5	165	243,885	34.0
	Sandy Creek, 1982	4,840	1			6	4,818	42.0
	Waratah, 1982	5,350		4		227	162,549	33.0
	Tintaburra, 1984	3,540	6		1	400	391,903	43.0
SANTOS GROUP	Tirrawarra, 1970	9,500	27		3	4,369	3,618,559	52.0
	Moorari, 1971	9,400	5		1	439	620,397	51.5
	Fly Lake, 1971	9,300	2		1	334	302,218	53.0
	Woolkina, 1982	9,700	1			123	33,435	51.5
BOND	Harriet, 1983	6,230	NA	NA	9	NA	NA	38.0
STRATA	Woodada, 1980	7,500	5		1	6	1,010	54.0
PACIFIC BASIN	Mount Horner, 1980	5,800		1	2	10	4,500	37.0
WOODSIDE	North Rankin, 1972	9,800	6			519	94,714	48.0
HOME ENERGY	Biina, 1981	4,920	2	4		4,717	900,040	35.0
	Sundown, 1983	3,608	1	1	1	75	64,785	35.0
	West Terrace, 1985	3,937	1				2,516	35.0
DELHI	Jackson, 1981	4,750	13	24		13,200	6,111,000	40.2-48.0
	Jackson South, 1982	4,800		6		960	489,000	40.8
	Naccowlah South, 1983	6,000	2	4		2,120	512,000	40.0-46.1
	Naccowlah West, 1983	5,700	3	1		1,630	333,000	40.0-48.3
	Strzelecki, 1978	5,800	14	3		6,550	6,017,000	43.4-50.9
	Dullingari, 1979	5,200	13	10	2	3,450	3,144,000	53.5-54.3
	Merrimelia, 1981	6,100	7	2		1,650	1,186,000	42.0-49.0
	Gidgealpa, 1984	6,150	6	2		1,040	188,000	45.0-51.0
	Limestone Creek, 1984	5,100	2	2	1	340	62,000	41.2
	Wancoocha, 1984	6,000	4		1	670	121,000	54.3
	Total Australia		246	500	112	539,819	2,247,755,633	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
AUSTRIA	MOBIL	Voitsdorf, 1963	7,000	3	25	10	609	21,099,133	36.0
		Sattledt, 1971	5,700	...	13	1	690	4,505,631	37.0
		Kemating, 1979	6,100	...	8	...	1,168	2,776,826	34.0
		Gaiselberg, 1938	5,200	...	33	31	692	31,429,223	25.0
		Other	...	2	67	39	2,244	24,351,506	33.0
	OEMV	Hochleiten, 1977	3,100- 5,000	7	35	...	235	1,418,000	21.3
		Matzen, 1949	6,100	81	864	...	12,313	425,892,000	25.7
		Pirawarth, 1957	1,600- 6,500	...	73	...	1,181	11,276,000	28.4
		St. Ulrich, 1938	1,600- 4,300	1	185	...	840	40,773,000	31.1
		Other	...	6	202	...	1,710	77,412,000	...
		Total Austria		**100**	**1,505**	**81**	**21,682**	**640,933,319**	
BAHRAIN	BANOCO	Awali, 1932	1,850- 4,600	158	113	36	41,850	750,000,000	33.0
		Total Bahrain		**158**	**113**	**36**	**41,850**	**750,000,000**	
BARBADOS	BARB. NOC	Woodbourne, 1966	6,500	18	55	37	1,864	3,119,000	30.5
		Total Barbados		**18**	**55**	**37**	**1,864**	**3,119,000**	
BENIN	SAGA	Seme, 1968	6,232	...	6	...	6,900	5,400,000	22.6
		Total Benin		...	**6**	...	**6,900**	**5,400,000**	
BOLIVIA	YPFB[e]	Camiri, 1927	3,936	13	70		13,972	262,361,000	55.0
		Carand, 1960	3,940	27	14				60.0
		Colpa, 1961	9,184	17	...	...			65.0
		Monteagudo, 1966	4,592	14	25	...			41.0
		La Pena, 1965	8,856	24	...	...			43.0
		Palmar, 1964	10,758	7	...	...			65.0
		Rio Grande, 1961	9,512	40	...	...			62.0
		Vuelta Grande, 1978	8,220	4	...	...			67.0
		Espino, 1979	14,655	2	...	...			56.2
		Other	...	15	50	...			...
	OCCIDENTAL	Tita, 1976	6,450	10	1	4	434	4,128,276	70.5
		Porvenir, 1978	9,600	6	...	...	4,344	7,210,317	69.5
	TESORO	La Vertiente, 1977	10,827	7	...	1	1,250	2,960,000	64.1
		Escondido, 1980	11,292	...	...	5	...	...	60.0
		Taiguati, 1981	10,174	...	...	1	...	...	63.0
		Los Suris, 1981	13,576	...	...	1	...	...	50.0
		Total Bolivia		**186**	**160**	**12**	**20,000**	**276,659,593**	
BRAZIL*	ALAGOAS	Furado, 1969	4,440- 5,500	11	33	...	2,430	11,673,870	35.0
		Pilar	NA	17	9	...	5,750	2,805,250	40.0
		Tabuleiro de Martins, 1957	NA	...	24	...	730	3,321,010	27.0
		Other	...	5	6	...	1,200	1,390,050	...
	BAHIA	Agua Grande, 1951	820- 4,265	24	102	...	6,560	268,524,140	40.0
		Aracas, 1965	3,280- 8,856	9	114	...	8,710	102,379,070	41.0
		Buracica, 1959	1,476- 1,840	...	197	...	7,620	129,010,080	35.0
		Faz. Imbe, 1964	2,130- 5,575	1	32	...	1,430	13,089,070	40.0
		Faz. Boa Esperanca, 1966	7,215- 8,036	...	12	...	900	14,510,570	39.0
		Faz. Panelas, 1962	NA	...	13	...	760	5,937,570	37.0
		Malombe, 1966	3,280	...	20	...	450	5,396,730	41.0
		Mata Remansc, 1971	4,445- 4,560	13	46	...	2,600	17,378,720	35.0
		Miranga, 1965	3,280- 3,936	7	157	...	12,160	169,371,730	40.0
		Rio Dos Ovos, 1979	NA	...	11	...	320	1,597,610	35.0
		Santana, 1962	NA	...	...	...	170	5,327,460	37.0
		Sesmaria	NA	7	16	...	1,510	1,842,910	NA
		Candeias, 1941	3,280- 7,415	2	29	...	3,040	74,276,250	30.0
		Cassarongongo, 1959	1,475- 4,755	...	18	...	750	13,284,060	32.0
		Dom Joao Terra, 1947	NA	...	53	...	1,460	19,504,670	38.0
		Riacho da Barra, 1982	NA	5	27	...	6,910	5,289,720	39.0
		Taquipe, 1958	3,115- 3,935	4	57	...	4,570	80,226,400	40.0
		• Candeias Mar	NA	1	13	...	760	6,371,570	30.0
		• Dom Joao Mar, 1947	920	3	280	...	5,120	76,704,110	38.0
		• Ilheus, 1979	NA	...	...	...	...	893,150	41.0
		Cexis, 1983	...	9	...	...	1,900	1,176,190	30.0
		Faz. Balsamo, 1983	2,500- 4,000	8	4	...	1,760	698,170	31.0
		Rio Pojuca, 1982	5,600- 6,200	9	6	...	2,440	1,691,960	35.0
		Other	...	8	121	...	6,800	24,448,440	...
	CEARA	Faz. Belem, 1980	1,150- 2,500	...	95	...	2,130	1,484,390	13.0
		• Curima, 1978	5,888	10	...	...	7,470	11,309,060	32.0
		• Xareu, 1977	5,717- 5,766	20	2	...	8,700	8,510,100	39.0
		• Atum, 1983	...	7	...	...	4,430	2,949,920	25.0
		• Espada, 1983	...	5	...	...	1,310	1,622,770	26.0
	ESPIRITO SANTO	Faz. Cedro, 1962	5,248	...	10	...	940	8,761,690	28.0
		Sao Mateus, 1969	NA	...	44	...	1,740	2,559,950	27.0
		Lagoa Parda, 1977	5,576	11	30	...	6,610	16,542,170	30.0
		Rio Itaunas, 1977	NA	3	30	...	1,620	2,182,560	28.0

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
		• Cacao, 1978	9,184	3	1		2,830	7,214,400	32.0
		Lagoa Suruaca, 1982		12	2		3,460	2,497,050	30.0
		Laqoa Piabanha, 1984		3			700	163,530	27.0
		Other		1	36		2,360	3,578,910	
	RIO DE JANEIRO	• Enchova, 1976	6,973- 7,885	10			35,560	42,927,890	23.0
		• Bonito, 1977	NA	10			11,410	17,888,190	27.0
		• Garoupa, 1974	11,382		14		24,090	41,820,880	30.0
		• Namorado, 1975	10,083	9			40,210	43,707,820	28.0
		• Garoupinha, 1974	12,693	3			4,800	6,780,400	30.0
		• Pampo, 1977	6,215	7			55,060	20,869,870	21.0
		• Area RJS-236, Trilha, 1983	NA	4			11,580	3,207,800	28.0
		• Linguado, 1981	NA	9			35,610	23,788,020	20.0
		• Badejo, 1981	NA	3	2		5,150	7,277,300	28.0
		• Bicudo, 1982	NA	5			14,550	20,548,780	22.0
		• Corvina, 1983	8,800- 9,000	4			13,630	9,830,960	27.0
		• Pirauna, 1982	8,900- 9,300	7			15,170	7,793,060	28.0
		• Sul de Pampo, 1978	9,300- 9,600	4			3,930	11,604,370	20.0
		• Cherne, 1982	9,900-10,200	9			31,740	10,516,550	27.0
		• Bagre, 1983	8,700- 9,000	1			1,170	654,140	25.0
		• Parati, 1982	8,900- 9,200	3			3,130	2,534,790	25.0
		• Viola, 1981	9,200- 9,900	4			5,890	1,069,270	26.0
		• Marimba, 1983	8,900- 9,200	1			1,220	220,140	28.0
		• Anequim	8,200- 8,500	3			2,930	528,340	27.0
	RIO GRANDE DO NORTE	Alto do Rodrigues	990- 1,120		164		2,600	1,968,710	18.0
		• Ubarana, 1973	7,216- 8,365	35	21		16,150	30,838,890	40.0
		• Agulha, 1975	5,412	2			990	6,566,550	33.0
		Estreito/Rio Panon	650- 820		135		2,800	2,648,010	16.0
		Faz. Pocinho	1,450- 2,000	13	47		3,300	2,981,370	35.0
		Palmeiras	1,450- 1,800		27		1,410	937,180	25.0
		Serraria	3,200- 3,900	2	8		1,170	773,640	27.0
		Guamaré	1,400- 1,600		8		840	773,650	25.0
		Other			46		550	2,107,070	
	PARA	• Area 1-PAS-11, 1983						495,000	41.0
	MARANHÃO	São João, 1983	4,950- 6,200		2		80	6,300	40.0
	SERGIPE	Atalaia Sul	NA				630	2,484,470	NA
		Carmopolis, 1963	2,460		581		23,440	139,482,600	24.0
		Riachuelo, 1961	1,475		187		4,400	16,906,980	28.0
		Siririzinho, 1967	1,640		138		5,830	29,008,560	30.0
		• Caioba, 1969 /	6,232- 6,890	9			3,010	27,058,710	36.0
		• Camurim, 1970	6,232	10	12		3,780	11,371,960	25.0
		• Dourado, 1970	3,620- 3,635	4			510	3,258,120	36.0
		• Guaricema, 1968	3,335- 4,430	7	6		6,000	30,474,080	41.0
		• Robalo, 1973		3			130	647,850	30.0
		Other		1	66		1,260	3,534,870	
		Total Brazil		**400**	**314**	...	**528,820**	**1,715,390,170**	
BRUNEI	SHELL	• Ampa SW, 1963	7,068- 8,155	82		125	20,335	478,181,144	41.0
		• Champion, 1970	4,300	190		60	50,621	245,096,532	23.0
		• Fairley, 1969	10,740	43		7	9,933	94,726,930	40.0
		• Fairley-Baram, 1973	9,500			3		12,361,594	40.0
		• Magpie, 1975	NA	18		3	17,910	49,079,701	31.0
		Seria, 1928	NA	375		166	27,338	950,551,996	34.0
		Jerudong, 1939	NA			2		636,814	39.0
		Rasau, 1929	NA	2		2	810	456,209	30.0
		Total Brunei		**629**		**368**	**126,947**	**1,831,090,920**	
BURMA(e)	MYANMA	Chauk-Lanywa, 1902	1,500- 4,000	170	275		30,000	466,280,000	36.0
		Mann, 1970	1,600- 7,000						37.5
		Myanaung, 1964	2,000- 4,000						40.5
		Prome, 1965	850- 5,000						36.0
		Yenangyaung, 1902	100- 6,700						36.0
		Total Burma		**170**	**275**	...	**30,000**	**466,280,000**	
CAMEROON	ELF(e)	• Betika, 1972	5,300	138	28	4	126,165	213,690,000	42.5
		Ekoundou S., 1975	6,200						24.0
		Kole, 1974	5,500						31.0
		Kombo Center, 1976	5,900						37.0
		Kombo North, 1978	7,200						35.0
		Ekoundou Horst plus Center, 1972	7,200						29.0
		Boa, 1976	5,900						35.0
		Bavo South, 1976	5,600						29.3
		Betika S. Marine, 1979	6,300						30.0
		Ekuondou N. Marine, 1977	5,250						36.0
		Mokoko NE plus Abana, 1977	4,600						29.0
		Asoma Marine, 1973	3,600						19.0
		Kita E. Marine, 1978	6,900						40.8
		Mokoko S. Marine, 1977	3,300						17.0
		Inova Marine, 1976	6,200						32.8
	TOTAL-CFP	• Moudi, 1979	5,250- 5,900	5	2	3	5,780	5,540,000	40.0
		• Moudi D., 1980	3,300				1,055	221,640	21.3
		Total Cameroon		**143**	**30**	**7**	**133,000**	**219,451,640**	

*Total output by Petrobras, grouped by states

CANADA

	Name of field, discovery date	Depth, feet	No. of wells capable of prod.	B/d average, first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
ALBERTA	Acheson, 1950	3,390	122	12,207	109,428,003	38.0
	Bantry, 1940	2,574- 3,300	176	5,187	40,854,578	
	Bellshill Lake, 1955	2,950	333	11,700	46,496,375	
	Bonnie Glen, 1952	3,959- 6,779	161	58,625	446,335,202	34.0-44.0
	Carson Creek N., 1958	8,787- 8,935	74	13,799	128,078,189	44.0
	Cessford, 1950	2,800- 3,028	239	3,344	26,807,023	
	Clive, 1951	6,074- 6,208	158	6,106	43,960,997	
	Countess, 1951	2,858- 4,272	142	8,513	54,660,883	
	Fenn-Big Valley, 1950	3,900- 5,400	336	40,196	289,353,420	32.0
	Gilby, 1962	4,201- 7,000	137	3,550	43,280,505	
	Golden Spike, 1949	3,570- 5,961	79	1,936	179,132,150	36.0
	Harmattan, E	8,040- 8,558	157	6,655	66,145,044	
	Harmattan-Elkton, 1955	8,796-10,757	68	5,652	55,728,981	
	Innisfail, 1956	6,730- 8,440	80	5,697	68,683,286	
	Joarcam, 1949	3,179	267	5,976	95,313,051	
	Joffre, 1953	4,983- 6,779	162	3,257	78,733,094	
	Judy Creek, 1957	8,307- 8,701	272	15,931	371,112,655	43.0
	Kaybob, 1957	4,870- 9,577	86	6,893	94,939,079	
	Kaybob S., 1958	5,600-10,042	99	11,478	66,215,065	
	Leduc-Woodbend, 1947	3,062- 5,380	741	5,856	370,596,847	40.0
	Lloydminster, 1933	1,690- 1,945	799	6,609	41,347,983	
	Medicine River, 1954	5,435- 7,600	315	10,109	57,933,881	
	Mitsue, 1964	5,908	303	27,765	248,802,542	43.0
	Nipisi, 1965	5,648- 5,726	296	37,468	233,566,031	41.0
	Pembina, 1953	3,000- 6,133	3,762	88,019	1,120,750,544	32.0-37.0
	Provost, 1946	2,760- 2,898	935	8,750	52,429,060	
	Rainbow, 1965	4,994- 6,160	249	49,263	450,893,223	38.0-42.0
	Rainbow S., 1965	6,102- 6,400	56	7,257	56,120,093	
	Red Earth, 1956	4,184- 4,878	212	4,603	31,263,596	
	Redwater, 1948	2,012- 3,200	846	20,044	769,187,679	35.0
	Simonette, 1958	10,500	35	2,019	35,310,308	
	Snipe Lake, 1962	8,500	98	3,256	49,258,354	
	Sturgeon Lake S., 1953	4,912- 8,471	145	11,838	123,456,592	37.0
	Sundre, 1954	8,700- 9,000	60	2,730	33,001,183	
	Swan Hills, 1957	8,100	783	44,992	627,878,717	40.0
	Swan Hills S., 1959	8,400	205	22,128	320,368,555	
	Turner Valley, 1913	3,100- 9,150	160	2,936	136,434,095	39.0
	Utikuma Lake, 1963	5,624	129	10,510	35,695,658	
	Virginia Hills, 1957	9,210	166	13,716	128,841,514	34.0
	Wainwright, 1925	1,903- 2,200	692	8,684	56,610,528	
	Westerose, 1952	6,818	29	21,479	112,627,896	
	Willesden Green, 1956	5,157	752	10,669	104,944,730	
	Wizard Lake, 1951	4,044- 5,973	44	31,745	300,795,337	
	Zama	5,702	227	7,147	68,297,552	33.0-37.0
	Other		11,065	307,456	1,212,509,378	
BRITISH COLUMBIA	Boundary Lake, 1957	3,418- 4,575	354	11,646	157,544,308	40.0
	Other		452	22,281	229,851,488	
MANITOBA	All fields		1,393	14,020	148,561,645	
SASKATCHEWAN	Steelman, 1950	4,600	661	9,726	243,565,414	27.0
	Weyburn, 1955	4,600	702	11,897	267,663,583	28.0
	Other		13,556	159,967	1,479,512,737	
ONTARIO	All fields			1,800	58,994,985	
NEW BRUNSWICK	All fields				798,578	
NORTHWEST TERRITORIES	All fields		110	13,052	29,938,575	
	Total Canada		**43,480**	**1,238,139**	**11,720,700,679**	

CHILE[e]

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells: Flow	No. of wells: Artificial lift	No. of wells: Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
ENAP-MAINLAND	Canadon, 1962	6,090	96	8	238	5,390	147,120,000	38.4
	Daniel, 1960	5,806						25.4
	Daniel Este, 1961	5,523						25.0
	Dungeness, 1962	5,251						26.6
	Posesion, 1960	5,522						63.6
TIERRA DEL FUEGO	Calafate, 1966	6,046	55	21	211	6,470	119,240,000	49.3
	Catalina Sur, 1961	5,779						44.0
	Cullen, 1954	[illegible]						41.8
	Tres Lagos, 1957	[illegible]						40.1
STRAIT OF MAGELLAN	● Ostion, 1977	7,156	34	52	18	22,140	56,400,000	33.0
	● Posesion, 1977	6,727						34.5
	● Spiteful, 1977	6,298						34.5
	● Spiteful Norte, 1978	7,150						39.0
	Total Chile		**185**	**81**	**467**	**34,000**	**322,760,000**	

CHINA, TAIWAN

	Name of field, discovery date	Depth, feet	No. of wells: Flow	No. of wells: Artificial lift	No. of wells: Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
CHINESE PETROLEUM	Tiechengshan, 1959		29		4	1,271	14,092,051	51.0
	Chingtsaohu, 1967		8		4	139		50.0
	Yunghoshan, 1971		6		1	323	5,732,188	45.0
	Other		41		12	336		50.0
	Total China, Taiwan		**84**	...	**21**	**2,069**	**19,824,239**	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
COLOMBIA	**ECOPETROL**	Galan, 1945	3,200		71	13	1,408	20,468,000	19.0
		Infantas, 1918	3,200		308	180	2,287	221,850,000	25.8
		La Cira, 1925	3,250		690	86	8,917	455,202,000	24.0
		Lisama-Nutria, 1957	9,500	26	120		7,127	28,754,000	31.0
		Llanito, 1960	7,300		55		3,861	17,494,000	21.0
		Peroles-Tesoro, 1977	4,400- 8,000		18		790	1,284,000	36.4
		Boquete, 1961	8,000		12	9	629	16,800,000	43.0
		Puerto Barco, 1958	7,000	2		2	1,026	84,203,000	47.9
		Cantagallo, 1941	6,800		22		690	17,686,000	19.7
		Casabe, 1941	3,800		287		3,260	217,082,000	20.7
		Yarigui, 1954	8,700		59		7,834	104,130,000	19.5
		Churuyaco, 1968	8,900		4		1,251	2,622,000	31.8
		Orito, 1963	6,600		26		3,100	42,968,000	39.7
		Acae			5		2,995	8,359,000	32.0
		Sucumbios			2		531	838,000	44.0
		Apiay, 1981	10,500	6			6,386	4,685,000	23.0
		Other		36	147	21	4,019	544,692,000	
	CHEVRON	Castilla, 1969	6,500		14	1	9,290	10,756,000	13.5
		Rio Zulia, 1961	5,700		19	5	2,594	128,843,000	41.0
	TEXACO	Velasquez, 1946	7,500		134	7	4,726	160,638,000	19.0-24.0
		Palagua, 1954	5,000		116	10	4,718	80,720,000	14.0-17.0
		Cocorna, 1963	2,100		51	2	3,833	10,480,800	12.0-13.0
		Tisquirama, 1963	8,000		3	2	425	5,0004,000	16.0-28.0
		Teca, 1981	2,100		102	22	12,096	6,798,896	12.0-13.0
		Other			5	10	247	4,174,000	12.0-16.8
	INTERCOL	Arauca, 1980	18,000		2	2	2,413	2,910,000	41.0
		Bonanza, 1963	4,000		15		870	11,910,000	30.0
		La Tirga, 1921						34,000	
		Provincia, 1962	8,000		54		13,430	142,619,000	33.0
	TENNECO	Dina K, 1969	6,500		22		5,709	20,197,354	22.5
		Dina Tertiary, 1961	3,600	2	35	4	5,872	15,069,794	20.1
		Palogrande, 1971	6,000		36	1	6,160	10,312,361	20.0
		Cebu, 1981					1,002	2,764,186	
		Brisas, 1973	4,200		4		1,592	3,782,321	23.3
		Pijao, 1981	5,500		7		1,420	2,737,563	21.0
		Hato Nuevo, 1984	7,000		4	1	1,654	733,102	36.2
		Tello, 1971	7,000		31	1	13,174	30,938,654	22.0
		La Canada, 1966	600	5			155	930,853	22.5
		San Francisco, 1985	3,000		5		6,131	190,000	26.0
	ELF	Trinidad, 1974	9,600	1	1		1,420	1,037,000	33.0
		Caño Garza, 1983	8,500	2	1		1,443	1,090,000	34.0
		Barquerena, 1982	10,300	1	1		1,212	740,000	37.0
		Tocaria, 1980	13,000	2			85	55,000	35.0
		Cravo Sur, 1982	10,300	1			1,096	389,000	38.0
		La Gloria Norte, 1983	12,900	1			407	91,000	18.0
	PETROCOL	Adalucia Sur, 1980	1,700		17	5	1,265	2,837,000	33.0
	ARGOSY	Burdine, 1974	11,000		2	1	160	2,463,000	24.1
		Nancy, 1974	11,000		1		381	1,591,000	25.5
		Maxine, 1976	11,000			1		109,000	26.3
	OCCIDENTAL	Payoa, 1962	8,000	17	33	6	1,680	68,249,000	27.9
		Salina, 1936	2,500	2	64	7	3,320	9,361,000	28.0
		Other				19		5,303,000	
		Total Colombia		104	2,605	417	166,091	2,534,975,884	
CONGO	**AGIP**	• Loango, 1972	3,000	4	31	2	18,085	60,382,476	26.8
	ELF CONGO	• Emeraude, 1969	820		113		19,787	141,327,066	21.8
		• Likouala, 1979	4,270	28			19,023	34,694,347	33.1
		• Yanga, 1979	2,950	47			29,824	40,681,580	29.4
		• Sendji, 1973	3,940	41			27,681	15,554,173	30.1
		Pointe Indienne, 1951	5,000		3		190	6,767,890	36.9
		Mengo, 1979	6,500		3		300	408,770	34.0
		Kundsi, 1980	4,000		2		185	276,285	35.8
		Total Congo		120	152	2	115,070	300,092,587	
DENMARK	**DUC**	• Dan, 1971	6,000- 6,400				7,530	26,407,034	30.4
		• Gorm, 1971	6,500- 7,000				30,770	41,042,082	34.0
		• Skjold, 1977	5,000				14,105	9,323,145	29.2
		Total Denmark		—	—	—	52,405	76,772,261	
DUBAI(c)	**DUPETCO**	• Fateh, 1966	7,900- 9,000	102	39	15	322,200	1,593,548,000	31.8
		• S.W. Fateh, 1970	7,500- 9,000						30.3
		• Falah, 1972	8,100						25.5
		• Rashid, 1973	9,400-11,500						38.0
	ARCO(c)	Margham, 1981	10,500	11		1	25,800	5,850,000	43.5
		Total Dubai		113	39	16	348,000	1,599,398,000	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells			B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
				Flow	Artificial lift	Shut-in			
ECUADOR	**CEPE**	Ancon, 1921	4,000	23	537	2,457	1,248	112,089,980	35.6
		Shuara, 1980	9,100	6	...	...	7,793	7,042,284	29.6
		Secoya, 1980	9,100	6	...	1	9,848	8,581,929	30.3
		Shushuqui, 1980	9,200	4	...	2	5,442	6,699,585	28.8
		Charapa, 1967	10,000	...	1	2	371	289,125	30.0
		Pichincha, 1983	9,000	1	...	...	1,236	777,626	NA
		Cuyabeno, 1972	8,050	8	...	1	5,140	2,277,558	28.8
		Sansahuari, 1979	8,100	2	...	2	1,357	615,517	28.8
		Bermejo, 1967	5,000	5	...	...	1,944	503,321	34.0
		Tetete, 1980	9,300	2	...	2	1,757	673,156	28.0
	TEXACO	Aguarico, 1968	9,850	...	4	6	8,367	37,543,347	27.2
		Atacapi, 1968	9,855	2	2	1	2,936	10,091,735	31.0
		Auca, 1970/Auca Sur, 1980	10,578		19	3	17,800	52,651,340	28.0
		Lago Agrio, 1967	10,175	6	19	9	11,874	101,186,768	28.5
		Parahuacu, 1968	10,173	1	4	...	1,645	5,409,787	30.0
		Sacha, 1969	10,160	18	65	19	60,568	201,077,444	28.0
		Shushufindi, 1959	9,772	...	44	16	101,816	410,513,941	30.0
		Yuca, 1970/Yuca Sur, 1979	10,423	...	7	1	4,204	8,002,570	28.0
		Culebra, 1973	10,626	...	1	...	897	1,163,995	17.5
		Yulebra, 1980	10,345	...	2	...	866	1,064,334	21.4
		Cononaco, 1972	11,233	8	2	...	19,162	7,265,295	33.3
		Rumiyacu, 1982	10,710	...	1	...	185	178,767	32.0
		Dureno, 1969	10,290	...	1	...	602	194,176	31.0
	CITY ECUATORIANA	Mariann, 1971	7,700	1	4	...	1,074	2,738,949	20.0
		Fanny, 1972	7,700	2	6	...	2,748	6,395,526	22.5
		Tarapoa, 1973	8,300	...	2	...	269	660,900	20.0
		Joan, 1974	7,500	...	...	2	...	5,479	18.0
		Total Ecuador		**95**	**721**	**2,524**	**271,149**	**1,075,694,452**	
EGYPT		Abu Gharadig, 1972	9,500	5	11	5	10,501	29,452,952	36.0
		• El Morgan, 1965	5,100- 6,400	...	79	22	169,121	896,220,057	27.0-32.0
		• Sidki (382), 1977	10,500	4	...	1	9,698	31,495,101	33.9
		• July, 1973	8,100-10,000	5	22	3	74,322	383,900,526	31.0-34.6
		• Ramadan, 1974	11,300	3	14	4	64,268	318,478,712	31.7
		Razzak, 1972; & East Razzak	7,700	2	10	2	3,605	47,768,062	36.0
		• SG-300, 1976	5,876	...	2	...	3,338	13,958,414	24.8
		• Shoab Ali, 1978	5,500	1	20	6	22,743	61,465,423	30.0
		• October, 1978	11,000	14	...	10	105,892	189,344,166	28.0
		• WD 33, 1972	9,800-10,800	...	2	...	216	2,035,341	32.0
		• SB 305, 1981	8,100	...	1	...	527	1,462,174	30.0
		• Badri (315), 1981	6,400	1	11	1	26,516	14,828,909	27.0
		• Younis (347), 1981	4,300	...	5	...	6,398	7,038,680	32.0
		• GH 376, 1981	8,600	...	3	2	3,242	3,203,795	25.0
		• GS 365, 1980	10,140	1	...	...	646	454,458	32.0
		• Hilal (404), 1982	9,200-10,000	4	...	...	33,735	8,374,329	32.0
		• Nessim (336), 1981	6,700	...	2	1	6,723	6,861,531	26.9
		• GS 277, 1980	8,610	1	...	...	2,530	879,899	34.0
		• SB 339, 1981	4,575	1	...	...	754	138,999	29.5
		• Waly (356), 1982	6,900	1	...	2	6,199	2,095,238	35.0
		• GS 345/346, 1982	7,460	2	...	1	2,707	731,606	38.0
	AGIP	Belayim, 1954	7,000- 8,500	2	94	13	41,630	387,736,000	22.5
		• Belayim, 1961	8,500	...	41	19	119,340	444,079,000	29.5
	PHILLIPS GROUP	El Alamein, 1966	8,700	3	9	5	2,487	64,353,098	33.6
		Umbarka, 1976	10,700	4	...	...	1,713	3,494,314	43.9
		Yidma, 1971	9,000	4	...	1	2,432	20,553,432	44.0
	EGPC[e]	Amer, 1965	3,500	1	22	10	60,000	502,600,000	21.5
		Asl, 1947	3,000	3	...	2			21.6
		Bakr, 1958	3,200	1	45	35			19.0
		El Ayoun, 1968	3,300	...	5	7			24.0
		Um El Yusr	...	3	16	20			21.5
		Gharib, 1938	2,200- 4,500	...	90	120			25.5
		Sudr, 1946	2,600	1	14	5			21.6
		Kareem	2,215- 2,310	...	8	27			16.6
		Shukheir	2,400- 2,500	5	...	4			34.0
		Kheir	1,037	...	1	3			30.0
		Matarma	3,026	1	1	...			17.6
		West Bakr	1,200- 1,500	...	20	2			18.0
		Elkhalig	1,580	1	...	...			29.4
		Ras Elbehar	...	4	...	4			32.5
	CFP	Ras Shukheir, 1980	6,200- 6,300	1	...	...	650	1,463,000	34.5
		• South Remadan	10,000	1	...	...	600	...	36.5
	SUCO[e]	• Ras Budran, 1978	11,400	7		...	83,547	41,588,000	26.0
		• LL 87-2, 1975	11,000	1	...	...			35.0
		Ras Fanar, 1978	2,300	6	...	...			35.0
		Zeit Bay, 1981	4,200	12	...	2			33.0
	BADR PETROLEUM (SHELL)	Badr el Din, 1982	...	4	...	...	9,920	5,526,095	38.0
		Total Egypt		**110**	**548**	**339**	**876,000**	**3,491,581,311**	

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells			B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
				Flow	Artificial lift	Shut-in			
FRANCE	**ALSACE**	All fields	...	...	33	8	706	2,594,863	...
		Abandoned	...	...	...	...	...	24,265,065	...
	AQUITAINE BASIN	Lacq Superieur, 1949	2,170	9	32	15	924	24,672,840	22.3
		Parentis, 1954	7,710	2	63	8	6,770	190,334,840	33.4
		Lugos, 1956	5,250	...	23	2	916	9,203,188	20.8
		Cazaux, 1959	7,550	2	38	2	5,049	63,379,556	34.2-37.3
		Lavergne, 1962	11,480	...	4	...	342	11,778,598	41.7
		Montastruc, 1973	5,200	...	6	1	288	4,885,814	32.8
		Pecorade, 1974	10,660	8	1	4	2,242	6,652,851	29.3
		Castera-Lou, 1976	9,600	...	9	...	850	1,780,592	21.7
		Vic Bilh, 1979	7,100	7	16	8	7,058	9,187,400	26.6
		Lagrave, 1984	6,500	1	...	2	2,913	599,400	42.5
		Other	...		18	2	416	13,702,431	...
		Abandoned	...	...	...		...	70,857	...
	PARIS BASIN	Coulommes, 1958	6,230		30	18	473	12,820,320	32.6
		Châteaurenard, 1958	1,800		24	12	442	4,385,837	27.5
		Saint-Martin, 1959	4,590		12	3	375	8,042,532	33.0
		Villeperdue, 1959	6,100		23	22	3,299	1,060,280	34.4
		Saint-Firmin, 1960	1,800		37	19	638	9,255,364	27.5
		Chuelles, 1961	1,800		44	15	642	6,365,593	27.5
		Courtenay, 1964	2,000		31	11	281	2,296,630	27.5
		Soudron, 1976	4,600		23	2	656	1,472,200	34.4
		Donnemarie, 1979	8,040		3		867	1,057,833	36.2
		Chailly	5,580		23	9	271	9,072,507	35.4
		Chaunoy, 1983	7,350		19	5	8,091	3,697,690	37.1
		Blandy, 1984	7,400		1	1	941	195,846	36.0
		St. Germain, 1984	7,200	...	:	...	516	98,520	36.0
		Other		7	51	19	1,269	22,409,596	...
		Abandoned						236,220	...
	SOUTHEAST + JURA	All fields abandoned				...	...	223,063	...
		Total France		**36**	**565**	**118**	**47,610**	**453,671,138**	
GABON	**ELF[(e)]**	● Anguille, 1962	9,200	202	12	116	99,901	803,657,000	31.2
		● Anguille NE, 1968	7,500						32.0
		● Anguille NNE, 1971	7,500						32.0
		● Barbier, 1972	6,000						29.5
		● Breme, 1976	5,000						36.5
		Clairette, 1956	4,400						29.0
		● Girelle, 1973	9,400						32.0
		● Gonelle, 1972	5,800						24.2
		● Grondin, 1971	7,500						16.4
		● Mandaros, 1972	4,900						19.8
		Olende, 1976	6,700						33.8
		● P.G.S. Marine, 1975	7,500						32.5
		● Port Gentil Ocean, 1964	6,500						33.0
		Tchengue, 1957	4,100						26.8
		● Torpille, 1968	8,200						35.8
		● Baliste, 1974	4,900						28.3
		● M'Bya Sud, 1969	6,700						35.4
		● Anguille SE, 1962	8,200						32.8
		● Ayol Marine, 1979	7,700						22.8
		● Baudroie N., 1980	7,500						34.5
		● Baudroie Marine, 1968	7,500						33.3
		Other	...						...
	SHELL/GULF/ELF	● Lucina-Marine, 1971	5,900	15		1	12,897	38,594,872	37.0
	SHELL/ELF	Gamba, 1963	3,000	31		9	8,003	146,523,427	32.4
		Ivinga, 1967	3,100	22		6	7,293	96,054,774	32.5
	AMOCO	Oguendjo B and C, 1981	5,000- 6,000	8	7		21,906	12,972,864	35.0
		Total Gabon		**297**		**132**	**150,000**	**1,097,802,937**	
GHANA[(e)]	**AGRI-PETCO**	● Saltpond, 1977	8,500	3	...	3	2,000	3,519,000	36.0-39.0
		Total Ghana		**3**		**3**	**2,000**	**3,519,000**	
GREECE	**N. AEGEAN PET. CO.**	● Prinos, 1974	8,000- 8,800	15			26,353	31,813,262	30.6
		Total Greece		**15**	**...**	**...**	**26,353**	**31,813,262**	
GUATEMALA*		Rubelsanto, 1974	5,300- 7,000	...	4		3,090	11,186,000	26.0-30.0
		West Chinaja, 1977	3,200- 3,800	3					35.0-43.0
		Caribe, 1981	6,830- 7,280	NA	1				22.0-24.0
		Tortugas	2,300			2			35.0
		Tierra Blanca	11,230			1			19.5
		Total Guatemala		**3**	**5**	**3**	**3,090**	**11,186,000**	

*New operator

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
INDIA(e)	**GUJARAT STATE**	Ankleshwar, 1960	2,953- 3,937		2,201	712	614,000	1,761,710,000	14.0-45.0
		Bakrol, 1968	4,593- 4,921						
		Kadi, N., 1968	2,953- 3,909						
		Kadi, S., 1968	5,906- 6,562						
		Kalol, 1961	4,265- 5,250						
		Kathana, 1965	5,250- 5,906						
		Kholka, 1966	4,265- 5,577						
		Kosamba, 1963	1,968- 2,625						
		Nawagam, 1963	4,429- 6,652						
		Sanand, 1963	4,265- 4,593						
		Sobhasen, 1968	4,429- 5,906						
		Wovel, 1963	4,265- 4,593						
	ASSAM STATE	Digboi, 1890	300- 7,500						
		Geleki, 1968	12,632-12,795						
		Lakwa, 1965	8,038-12,795						
		Moran, 1958	11,000						
		Nahorkatiya, 1953	9,500						
		Rudrasagar, 1961	10,171-10,500						
	MAHARASHTRA STATE	● Bombay High, 1974	4,530- 4,630						
		Total India			**2,201**	**712**	**614,000**	**1,761,710,000**	
INDONESIA	**PERTAMINA UEP I**(e)	Besitang, 1977	3,973	73	148	32		-	51.5
		Gebang, 1977	2,917						54.0
		K. Simpang, 1971	3,740- 5,019						45.0
		P. Tabuhan, 1937	3,350- 5,893						50.8
		Rantau, 1929	2,764						45.3
		Serang Jaya, 1926	3,701						47.5
		Other							...
	PERTAMINA UEP II(e)	Benuang, 1942	6,103	70	342	1,007			35.1
		Benakat East, 1973	NA						NA
		Tempino, 1931	1,647						23.0
		Gn. Kemala, 1938	5,448						38.0
		Limau, 1928	3,896- 4,626						NA
		Ogan Timur, 1943	3,793						27.42
		Talang Jimar, 1937	4,123						31.0
		T. Miring, 1935	640						NA
		Tanjung Tiga, 1938	3,750						28.0
		Kenali Asam, 1931	2,077						29.0
		Belimbing	5,371						...
		Kuang, 1940	5,249						25.1
		Other							
	PERTAMINA UEP III(e)	Cemara, 1976	3,964- 7,104	33	55	96	51,093	2,053,540,800	...
		Jatibarang, 1969	3,063						29.0
		Tugu Barat, 1979	3,014						...
		Other							...
	PERTAMINA UEP IV(e)	Bunyu, 1923	2,077	32	129	173			33.2
		Sangatta, 1939	1,842						33.0
		Tanjung, 1938	2,296						39.9
		Tapian Timur, 1967	4,396						38.8
		Warukin S., 1966	2,067						26.9
		Other							...
	PERTAMINA UEP V(e)	Klamono, 1936	574		47	8			19.0
		Linda, 1977	3,281						19.0
		Sele, 1951	2,156						35.0
	PERTAMINA (from Stanvac)	Sago, 1940	1,800	NA	NA	NA			34.0
		Lirik, 1939	1,600						34.0
		Molek, 1956	2,600						34.0
		N. Pulai, 1941	1,800						34.0
		S. Pulai, 1941	1,800						34.0
		Talang Akar, 1922	2,800						35.0
		Benakat, 1932	1,600						35.0
		Jirah, 1930	2,300						35.0
		Rajah, 1940	6,000						38.0
		Abab, 1951	6,000						36.0
	CALTEX	Aman, 1974	4,700		10		1,308		36.1
		Anatara, 1978	1,425		5		643		35.8
		Balam SE, 1972	4,500		13		777		23.2-30.6
		Balam S., 1969	1,600		48		9,657		33.3
		Bangko, 1970	1,950		65	1	18,876		34.1
		Batang CPI & CT, 1975	690		11		817		20.8
		Bekasap, 1955	2,950		53	1	9,074		33.5-34.1
		Bekasap S., 1968	3,900		10	1	1,014		34.0
		Benar, 1973	2,450		25		3,762		33.2
		Intan, 1977	3,350		6		812		32.8
		Jorang, 1972	5,500		15		8,384		37.9
		Kerang, 1977	3,900		11		1,580		36.7
		Kopar, 1974	5,300		15	3	849		37.5
		Kotabatak, 1952	5,500		64		11,733		28.7

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	Libo, 1968	6,000	7	1		1,322		34.6-42.2
	Lincak, 1981	2,570		4		1,104	5,524,688,800	33.0
	Menggala N., 1968	3,850		14		4,843		32.5-33.5
	Menggala S. CPI & CT, 1968	3,765		8	1	4,045		32.5-33.5
	Minas, 1944	2,600		393	4	194,782		35.0
	Pager, 1974	4,300		23		6,529		36.8
	Pelita, 1977	6,600	1	4		782		37.5
	Pematang, 1959	3,750	4	37		5,418		31.7-35.0
	Pematang Bow, 1969	5,300		7		389		31.7-35.0
	Pemburu, 1981	2,300		7		4,782		35.2
	Petani, 1964	4,750	2	30	1	8,147		32.8
	Petapahan, 1971	4,500		20		7,120		28.1
	Pinang, 1971	3,950		19		1,437		30.3
	Pudu, 1972	5,950		12		954		35.7
	Puncak, 1979	2,400		10	1	5,402		32.0
	Pungut, 1951	3,400		25	2	1,803		37.7
	Seruni, 1972	3,000		22		5,898		34.8
	Sikladi, 1975	4,340		18		1,540		39.0
	Sintong, 1971	3,400		19		4,303		32.0
	Tandun, 1969	3,000		9		707		33.7
	Telinga, 1975	4,205		9	1	940		35.3
	Topaz, 1977	5,200		7		2,292		32.7
	Ubi, 1976	4,350		20		1,913		34.7
	Waduk, 1975	6,100		10		2,128		37.7
	Duri, 1941	770		916	72	39,928		21.2
	Kulin, 1970	2,050		51	4	2,781		20.4
	Libo SE, 1973	5,900	18	4	1	9,542		34.6-42.2
	Other			47	9	2,358		
CAL ASIATIC TOPCO	Beruk, 1974	1,750	19	19		6,796	32,876,390	38.0
	Beruk NE, 1976	1,800	3	3	1	294	1,407,845	39.8
	Bungsu, 1976	2,050	7	7		3,738	8,404,694	38.2
	Kasikan, 1972	660	18	18	1	936	4,917,728	27.7
	Pedada, 1973	950	18	18	1	11,409	53,745,648	31.3
	Sabak, 1974	2,350	13	13	1	1,566	15,612,785	35.7
	Zamrud, 1975	3,600	31	31	1	21,112	35,078,273	40.2
	Langgak, 1976	1,380	18	18	1	1,522	2,793,272	31.9
	Lindai, 1971	1,100	14	14	2	911	5,056,057	30.9
	Tanjungmedan, 1976	2,770		2		726		29.0
	Benua, 1978	2,400		14		11,037		41.5
	Damar, 1974	4,650		4	1	702		34.8
	Dusun, 1979	2,550		5		3,642		42.3
	Pusaka, 1977	2,250		17		7,076		37.2
	Other			11		779		
STANVAC (Central Sumatra)	Binio, 1972	1,600		22	1	809	11,175,449	34.0
	Pekan, 1976	3,700		23	22	1,116	6,685,754	35.0
	Merbau, 1979	2,700	2	21	12	1,382	4,878,470	36.0
	Kerumutan, 1980	3,000		25	9	2,208	3,710,362	35.0
	N. Merbau, 1980	2,600		9	3	961	2,243,970	36.0
	Panduk, 1981	2,500		8	2	450	1,137,716	46.0
	Kayuara, 1982	3,700		10	5	764	1,215,563	35.2
	Other	4,600			1		9,175	
	Gemuruh, 1983	2,800		10	1	1,223	359,765	34.0
	E. Kayuara, 1983	3,500		16		2,039	539,011	35.0
	Mutiara, 1985	2,700		1		140	5,156	34.0
STANVAC (South Sumatra)	Ibul, 1970	5,700	2	17	25	1,879	20,611,332	36.0
	Rambutan, 1972	4,500	5	3	15	214	3,105,885	42.0
	Other	4,500	3		8	138	722,666	
ARCO (Java Sea)	● Ardjuna, 1969	2,380- 7,250	136	119	36	162,891	521,642,200	37.0
	● Arimbi, 1972	2,943		11	1	2,573	20,253,400	33.2
PERTAMINA (N.E. Kalimantan)*	Sembakung, 1976	2,600	11	6	2	8,012	13,561,900	36.2
	Bangkudulis, 1980	3,250			1		85,000	33.5
PHILLIPS GROUP	Salawati,† 1976	5,749		7	6		26,234,720	39.2
ROY M. HUFFINGTON INC.	Badak, 1972	5,190-10,600	22	13	9	6,258	32,802,965	32.0
	Nilam, 1974	7,500-11,510	32	9	3	8,221	12,442,628	32.0
	Pamaguan, 1974	900- 5,100	6	9	10	2,599	3,873,090	30.0
	Mutiara	900- 5,770	6	1	17	2,218	594,602	30.0
	Badak,[illegible] 1972	3,500-15,800	51		31	6,238	33,400,000	42.0
	Nilam,[illegible] 1974	7,400-13,400	54		23	8,527	4,800,000	42.0
	Other		10		34		606,451	
TOTAL INPEX	● Bekapai, 1972	4,600- 5,600	34		13	19,334	137,100,000	40.0
	● Handil, 1974	3,000- 9,000	150	0	12	127,067	507,200,000	31.0
	● Nilam, 1976	8,000- 9,000				6,742	11,880,000	53.0
	● Tamboza, 1984	8,500-11,500				3,580	657,000	53.0
UNION OIL	● Attaka, 1970	7,500	17	30	12	43,139	389,787,036	39.0
	● Melahin, 1972	7,500	3	9		907	5,442,216	23.4
	● Kerindingan, 1972	7,000	2	3	3	645	4,807,464	26.2
	● Sepinggan, 1973	11,150	7	8	7	7,309	35,833,550	32.5
	● Yakin, 1976	5,100	1	18		9,906	9,851,683	19.0
	● Rajah, 1981	5,500	3			4,130	1,747,740	33.0
AARNL$^{(e)}$	Bula	280- 800		44	51	507	5,111,800	22.5

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells			B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
			Flow	Artificial lift	Shut-in			
ASAMERA[†] (North Sumatra)	Julu Rayeu, 1968	2,832	3	7	37	623	11,995,681	53.6
	Tualang, 1973	2,631	2	17	35	2,570	27,003,755	49.9
	Other		1	9	103	201	20,662,683	
ASAMERA (South Sumatra)	Corridor Block: Kluang, 1913	2,591	9	23	42	605	[§]32,928,885	42.6
	Tanjung Laban, 1982	3,590	6		4	3,072	1,124,584	38.1
	Ramba, 1982	3,150	29	1	21	22,706	9,501,772	37.0
	Other		6	8	111	609	24,008,252	
CONOCO GROUP	● Udang, 1974	5,595	3	19	5	11,853	45,886,066	40.0
IIAPCO	● Cinta, 1970	3,500		42	3	14,185	158,678,886	34.0
	● Gita, 1972	5,000	1	6	2	1,246	6,404,703	34.5
	● Kitty, 1973	2,700		7		1,116	12,695,081	18.0
	● Nora, 1973	3,200		5		792	8,295,746	29.0
	● Rama, 1974	3,200		47	21	8,003	81,852,122	31.0
	● Selatan, 1971	4,000		11	4	2,044	19,018,328	19.5
	● Zelda, 1971	7,500	1	32	10	8,253	27,589,363	33.0
	● Krisna, 1979	4,500		33	5	10,534	46,690,183	37.0
	● Yvonne, 1980	4,500		10	1	11,101	5,681,828	36.0
	● Farida, 1982	8,000		18	4	5,493	8,129,201	32.0
	● Titi, 1982	8,000			4	12	1,653,466	33.0
	● Sundari, 1982	4,400		13	2	4,181	6,425,976	25.0
	● Duma, 1983	2,300		3	3	223	441,663	16.0
	● Karmila, 1983	4,800		5	1	17,905	13,315,232	36.0
MOBIL OIL	Arun, 1971	10,050	30		1	107,275	196,973,712	55.0
PETROMER TREND	Cenderawasih, 1976	3,500		8	4	1,029	10,592,059	28.1
	Jaya, 1973	3,050		15	2	3,359	33,277,705	41.4
	Kasim, 1972	3,350		35	2	6,227	41,282,452	36.6
	Walio, 1975	2,750		181	32	20,584	129,739,429	33.8
	Other			8	6	661	10,749,058	
TESORO	Samboja, 1909	360- 4,380		28	94	560	63,902,330	21.0
	Sanga Sanga, 1897	275- 6,000	16	104	12	3,493	263,621,515	32.0
	Tarakan, 1906	200- 6,540	2	89	1,029	1,978	208,489,077	20.0
LEMIGAS	All fields, 1893-1909	2,155- 2,297	5	66	348	450	130,467,750	
	Total Indonesia		1,063	4,315	3,861	1,234,000	11,229,447,053	

*Pertamina took over operation of N.E. Kalimantan from ARCO in July 1984. †Relinquished Oct. 1, 1984. §Cumulative field production. Previous year's figures reported only Asamera's cumulative production.

IRAN(e)

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
NIOC	Agha Jari, 1936	7,440	58		31			34.0
	Ahwaz Asmari, 1958	8,150	73		12			32.0
	Ahwaz Bangestan, 1958	12,000			7			24.3
	Bibi Hakimeh, 1961	4,570	19		14			29.9
	Binak, 1959	10,440			4			29.9
	Chillingar, 1974	3,350			1			39.3
	Chesmeh Khush, 1967	10,700			4			27.7
	Dehluran, 1972	11,900			6			34.3
	Gachsaran, 1937	3,400	46		16			31.0
	Haft Kel, 1927	1,980	2		9			37.7
	Karanj, 1963	5,360	7					33.9
	Kharg, 1961	10,900						31.6
	Kupal, 1965	10,500			7			32.8
	Lab-e Safid, 1968	4,350			7			35.3
	[illegible] 1963	7,100	4		4			28.4
	[illegible]63	9,400	55		57			32.6
	[illegible] Suleiman, 1908	1,600	7		17			39.3
	Naft Safid, 1938	5,000	5		14	2,198,000	33,915,276,000	36.8
	Paris, 1964	4,670	22		5			38.8
	Par-e Siah, 1964	4,250			1			37.7
	Pazanan, 1961	7,250	44		27			37.2
	Rag-e Safid, 1964	7,230	19		10			28.6
	Ramin, 1966	12,200						32.9
	Ramshir, 1962	8,750			3			27.6
	Sulabedar, 1971	3,400			1			30.4
	Naft-e Shah, 1923	2,000- 3,000						43.0
	● Bahregansar, 1960	9,000						30.0
	● Hendijan, 1968	11,000						23.0
	● Nowruz, 1966	8,200						21.0
	● Rakhsh, 1969	7,650						35.8
	● Rostam, 1966	7,000						34.4
	● Ardeshir, 1969	2,800						27.0
	● Cyrus, 1962	7,000						48.3
	● Darius, 1961	11,000						34.0
	● Fereidoon, 1966	7,000						28.5
	● Sassan, 1965	7,500- 8,100						34.0
	Total Iran		361		257	2,198,000	33,915,276,000	

IRAQ(e)

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	Ain Zalah, 1939	5,200- 6,500						31.0
	Bai Hassan, 1953	4,800- 5,400						34.0
	Butmah, 1953	3,900						30.0
	Hamrin, 1973	2,000						
	Jambur, 1954	5,500-12,500						38.0
	Kirkuk, 1927	2,800- 4,200	NA	NA	NA	1,298,000	17,230,855,000	36.0

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
		Naft Khaneh, 1909	3,500						42.5
		Rumaila North, 1958	10,000						34.0
		Rumaila, 1953	10,800						35.0
		Zubair, 1949	11,000						34.2
		Abu Ghurab							27.7
		Buzurgan							27.7
		Jabal Fauqui							
		Lahis							
		Total Iraq		**NA**	**NA**	**NA**	**1,298,000**	**17,230,855,000**	
ISRAEL	**LAPIDOTH**	Heletz-Brur, 1955	5,200		4		64	16,317,956	29.2
		Kochav, 1962	5,500		2		24	4,056,404	27.9
	OEIL	Ashdod, 1976	8,400		2		41	104,670	32.5
	EMOG	Gurim, 1984	3,280		1			6,954	17.0
		Total Israel		**...**	**9**	**...**	**129**	**20,485,984**	
ITALY	**AGIP**	Cavone, 1979	563-18,068	4	2	10	2,660	4,565,814	24.0
		Malossa, 1973	17,881-21,231	6		4	4,830	22,967,428	55.0
		Pisticci-S. Cataldo, 1960	6,820- 6,880	6	1	5	905	6,383,335	11.4
		● Gela, 1956	11,280-11,350	44	16	12	6,710	90,687,380	10.0
		● Perla	7,850	4	4		925	760,969	13.3
		● Cela Mare	10,300	8	3	6	1,260	13,747,754	10.0
		Ragusa, 1954		29	30	16	4,545	122,227,280	
		● Nilde, 1977		2			9,420	9,365,810	
		Other		16		49	610	19,868,762	28-55.9
	ELF	● Santa Maria a Mare, 1974	7,900	11			2,900	18,286,300	23.0
		● Rospo Mare, 1975	4,600		3		2,500		11.0
		● Sarago Mare, 1979	5,200	6			4,500		8.0
		Total Italy		**136**	**59**	**102**	**41,665**	**308,860,832**	
IVORY COAST	**ESSO COTE D'IVOIRE**	● Belier, 1975	5,500	6	8		5,600	12,500,000	33.0
	PHILLIPS	● Espoir, 1980	6/500-11,000	6		2	16,488	15,857,921	33.0
		Total Ivory Coast		**12**	**8**	**2**	**22,088**	**28,357,921**	
JAPAN	**JAPEX**	● Aga-Oki, 1972	7,590	11		2	817	4,355,945	24.8
		Higashi-Niigata, 1965	4,500- 9,200	20		7	1,100	7,679,304	53.9
		Sarukawa, 1958	2,000- 3,200	6	16	49	669	10,043,513	32.3
		Yoshii, 1968	8,000	10		14	889	8,021,058	61.8
		Other					1,537	27,397,813	
	TEIKOKU OIL	Kubiki, 1959	1,100- 6,400	20	75	32	494	12,349,875	29.7
		Minami-Aga, 1964	7,300- 9,600	9	2	15	506	13,183,799	38.5
		Yabase, 1933	1,100- 5,800		61	9	342	32,726,807	33.0
		Other		4	22	6	87	2,436,117	
		Total Japan		**80**	**176**	**134**	**6,441**	**118,194,231**	
KUWAIT[e]	**KOC**	Burgan, 1938	4,800	322		67	857,000	21,630,575,000	30.9
		Ahmadi, 1953	4,800	63		22			31.7
		Magwa, 1951	4,800	84		27			33.0
		Raudhatain, 1955	8,600	43		4			33.9
		Bahra, 1956	8,500			2			
		Sabriya, 1957	8,300	30		15			34.4
		Minagish, 1959	10,000	9		6			34.2
		Umm Gudair, 1962	9,000	21		10			24.6
		Total Kuwait		**572**	**...**	**153**	**857,000**	**21,630,575,000**	
LIBYA	**AGIP**	Bu Attifel, 1968	14,300	31			153,120	646,919,000	41.0
		Rimal-Katil, 1965	14,000	6		1	3,670	2,105,000	35.0
	ELF	El Meheiriga	10,500	2			1,200	28,000	46.0
	LNOC[e]	Arshad, 1966	10,100	NA	NA	NA	472,736	6,913,861,000	42.0
		Jebel, 1962	8,100						38.0
		Majid, 1968	9,000- 9,800						
		Dor Mansour Unit	5,600						
		Nasser, 1959	5,500- 7,600						38.0
		Lehib-Dor Marada Unit, 1965	9,500						50.0
		Raguba, 1961	5,400						43.0
		Beda, 1959	4,000						36.0
		Bualawn, 1972	6,000						40.0
		Dor, 1967	6,400						33.2
		Kotla, 1963	5,500						34.0
		Sahabi B & D, 1961	9,000-10,000						39.0
		Sarir, 1961	9,000						37.2
		Amal, 1959	9,900						37.5
		Ora, 1962	7,250						40.2
		Ghani, 1978	6,000						40.0
		Other							

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells			B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
			Flow	Artificial lift	Shut-in			
OASIS GROUP[d]	Bahi, 1968	3,500- 3,750		491		295,935	4,850,095,000	43.4
	Beihedan, 1962	7,000						33.6
	Dahra, 1959	3,100- 3,700						37.0-41.0
	Defa, 1969	5,400- 5,900						35.6
	Gialo, 1961	2,200- 6,300						35.7
	Harsh, 1978	7,400						34.6
	Khalifa, 1978	5,400- 7,000						34.6
	Masrab, 1978	10,000						39.6
	Samah, 1961	9,000						33.4
	Waha, 1960	6,000						36.0
	Zaggut, 1962	6,000						36.4
	Balat, 1983	5,100- 5,400						32.2
OCCIDENTAL	Ali, 1975	3,900		1	1	361	4,951,338	50.0
	Almas, 1975	4,000		5	3	727	16,516,182	49.5
	Intisar A, 1967	9,750	8		11	14,896	693,057,719	45.0
	Intisar B, 1974	9,600	2			705	5,850,562	50.0
	Intisar C, 1967	9,650	1		5	348	86,152,606	37.5
	Intisar D, 1967	9,400	13	6	8	53,653	986,754,989	39.0
	Intisar E, 1968	5,300- 7,100		8	3	1,845	14,840,751	34.7
	Nafoora-Augila, 1966	2,200-10,000	13		42	35,901	796,598,000	35.5
	Aswad, 1978	6,250	8			4,092	13,438,813	46.0
	Sabah, 1977	5,500		36	2	31,781	74,811,187	42.0
	Zella, 1977	6,750	27		4	12,686	51,132,736	48.1
	Other	7,900- 8,900		1	1	269	1,453,018	40.4
	Fidaa, 1979	7,000	2	7		10,477	4,214,279	41.7
	Hakim, 1978	6,700	3			1,661	311,226	48.5
	Total Libya		**116**	**555**	**81**	**1,046,000**	**15,163,101,315**	
MALAYSIA								
ESSO MALAYSIA[e]	• Bekok, 1976	5,500	23		7	251,620	398,515,650	47.0
	• Pulai, 1973	4,300	19	4	9			42.3
	• Tapis, 1975	6,700	70		36			45.0
	• Tembungo, 1971	6,000	10	1	4			38.0
	• Kepong, 1979	6,000	3		7			47.0
	• Tiong, 1978	5,800	28		14			47.0
	• Tinggi, 1980	4,400	26		5			48.0
	Irong Barat, 1979	3,300	10		2			35.0
	Semangkok, 1980	3,700	5					42.5
SARAWAK SHELL BERHAD	• Bakau, 1971	11,000	2		1	410	6,792,676	39.0
	Baram, 1963	9,500	17		19	14,859	125,791,779	40.5
	Baronia, 1967	7,900	25		15	21,437	133,017,253	42.0
	Betty, 1967	7,900	8		6	14,445	46,317,729	38.0
	Fairley-Baram, 1963	8,655			2		5,849,413	40.0
	West Lutong, 1966	5,600	11		16	7,907	114,022,084	39.5
	Miri, 1911						79,727,300	27.0
	Temana, 1972	3,100	16		6	15,134	26,829,036	35.0
	Tukau, 1966	5,000	23		21	20,072	70,779,493	29.2
	Bokor, 1972	2,900	9		2	18,708	12,057,302	35.0
	Bayan, 1976	4,200	6		1	20,414	6,267,998	37.3
SABAH SHELL	Samarang, 1972	5,700	31		31	42,543	189,330,607	37.0
	South Furious, 1974	3,300	7		8	3,001	8,418,972	30.0
	• Erb West, 1977	6,875	9		5	11,418	14,545,653	30.0
	• St. Joseph, 1975	2,200	3		6	10,867	8,525,600	32.0
	• Barton, 1971	2,400	4			5,165	5,544,530	37.0
	Total Malaysia		**370**		**223**	**458,000**	**1,252,333,075**	
MEXICO								
NORTH ZONE, NE	Mision, 1945	5,440	3			2	1,876,257	
	Monterrey, 1950	6,510	1	4	1	39	12,028,304	
	Tigrillo, 1971	3,342			11		1,372,723	
	Other		2	9	66	22	17,704,589	
NORTH ZONE, N.	• Arenque, 1970	11,362	17			6,567	71,328,461	26.0
	Constituciones, 1956	6,350	76	100		6,036	73,761,169	17.0
	Ebano-Panuco, 1901	1,450	141	183		3,843	940,973,898	12.0
	Tamaulipas	4,200	65	87		6,205	71,342,086	19.0
	Other					622	23,137,722	
NORTH ZONE, S.	Chicontepec, 1973	4,264	219	1		4,271	10,810,818	34.1
	• Isla de Lobos, 1963	6,875	9			538	20,971,659	40.0
	• Marsopa, 1974	10,198	7			1,176	13,581,242	39.0
	Naranjos-C. Azul, 1909	1,800	206			8,432	1,209,699,719	22.0
	Tres Hermanos, 1959	6,960	34			2,918	105,162,139	21.0
	Other					634	24,818,912	
CENTRAL ZONE, POZA RICA	• Atun, 1966	9,0[illegible]	7			1,881	36,177,004	37.0
	• Bagre, 1973	10,91[illegible]	8			4,472	40,256,686	33.0
	Escolin, 1942	7,216		95		10,680	211,786,036	26.3
	Hallazgo, 1955	10,170		36		4,788	74,559,490	25.0
	Jiliapa, 1958	7,390		29		1,184	28,032,555	24.0
	Mecatepec, 1941	7,544	1	31		2,361	135,636,076	29.6
	Miquetla, 1959	6,480	1	56		1,089	25,204,999	35.0
	Poza Rica, 1930	7,090		132		16,423	878,038,379	35.0
	Pres. Aleman, 1949	8,036	44	42		2,040	31,968,063	26.0

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells			B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
			Flow	Artificial lift	Shut-in			
	Remolino, 1962	10,745		36		970	21,188,104	29.5
	San Andres, 1956	10,410	5	118		15,919	340,346,660	29.0
	Other		114	201	1	7,479	98,999,388	
CENTRAL ZONE, CUENCA DEL PAPALOAPAN	Matapionche, 1974	11,129	21	8	16	5,068	23,401,549	35.6
	Other		22		9	1,663	29,484,161	
SOUTHERN ZONE, NANCHITAL	Ixhuatlan Ote., 1965	1,960	1	19	14	1,274	9,851,549	22.6
	Moloacan, 1962	500	1	169	37	2,426	20,664,575	22.3
	Santa Rosa, 1952	1,312	6		3	166	5,189,841	25.4
CENTRAL ZONE, N. FAJA DE ORO	Acuatempa, 1955	4,085	6			227	25,830,426	21.0
	Muro, 1965	3,966	11		8	567	19,513,511	17.0
	Ordonez, 1952	5,220	8			1,051	57,541,952	21.0
	Ocotepec, 1953	3,737	13			431	19,709,872	20.0
	Santa Agueda, 1953	4,780	13			2,085	102,748,748	16.0
	Other		50	7		1,367	56,575,363	
SOUTHERN ZONE, EL PLAN	Agata, 1956	3,830	2	7	6	478	11,678,492	
	Bacal, 1976	3,500	18	6	16	11,534	78,740,811	35.0
	Concepcion, 1974	1,600	2	1	12	424	4,125,234	31.0
	Cuichapa, 1935	2,200	18	45	60	10,114	122,203,743	30.0
	El Plan, 1931	1,700	1	66	19	2,486	152,840,364	30.0
	Lacamango, 1973	1,700	8	10	9	1,763	10,172,282	26.3
	Los Soldados, 1953	4,492	3	15	4	1,031	23,780,584	32.0
	Other		19	7	12	280	17,664,357	
SOUTHERN ZONE, AGUA DULCE	Blasillo, 1967	7,216	15	16	27	5,263	24,469,974	40.0
	Cinco Presidentes, 1960	6,862	10	63	61	8,773	246,584,140	35.0
	Burro, 1931	2,200	1	22	15	1,079	21,893,414	26.0
	Venta, 1954	4,730	3	17	68	1,155	58,467,450	41.0
	Ogarrio, 1957	5,790	14	43	137	6,697	134,393,606	38.0
	Otates, 1965	7,469	1	11	6	1,799	25,087,885	39.0
	Rodador, 1971	11,398	4	10		1,820	7,974,839	26.0
	Sanchez Magallanes, 1957	4,240	3	70	272	5,985	132,515,022	27.0
	San Ramon, 1967	9,517	5	24	36	5,332	57,306,963	30.0
	Tonala, 1928	1,770	1	30	30	1,330	77,498,945	28.0
	Other		3		12	174	1,085,176	
SOUTHERN ZONE, COMALCALCO	Agave, 1977	13,450	7		9	12,236	86,670,809	41.7
	Arroyo Zanapa, 1978	14,599	1		1	1,667	8,563,502	38.9
	Artesa, 1977	11,800	2	1	2	1,585	28,648,988	26.4
	Ayapa, 1972	8,200	3		2	573	5,294,293	7.2
	Cacho Lopez, 1977	14,250	1			73	2,326,897	29.0
	Cactus, 1972	14,100	14		16	13,346	264,123,138	31.5
	Carrizo, 1962	3,500	11	7	17	830	10,309,757	23.3
	Castarrical, 1967	10,080	19	19	21	1,681	37,328,414	29.3
	Comoapa, 1979	14,432	4		7	5,673	14,758,988	44.5
	Copano, 1977	11,890	9		1	11,867	15,660,987	43.9
	Cunduacan, 1974	13,775	8	4	30	27,428	378,944,201	28.9
	El Golpe, 1963	3,500	48	45	42	3,444	74,371,538	25.7
	Giraldas, 1977	15,225	21		1	40,419	104,452,256	37.0
	Iride, 1974	13,775	12		4	38,727	145,053,560	28.5
	Muspac, 1982	9,676	1		12	211	905,653	57.0
	Mecoacan, 1957	2,200	9	8	13	481	36,562,694	8.6
	Mora, 1981		61		2	48,534	26,408,860	38.1
	Mundo Nuevo, 1977	11,800	4		1	5,204	23,237,707	46.0
	Nispero, 1974	14,100	4		14	5,057	105,957,000	34.4
	Paredon, 1978	15,690	12		1	47,315	87,812,979	39.8
	Oxiacaque	11,150	5		16	2,889	93,557,426	29.1
	Platanal, 1978	15,900					2,967,641	30.2
	Rio Nuevo, 1975	14,950	5			11,668	58,044,931	34.8
	Samaria (Cret), 1973	14,209	25	1	23	112,004	917,120,048	31.0
	Santuario, 1966	9,617	19	9	9	4,768	32,351,804	37.0
	Sitio Grande, 1972	13,766	19		3	38,206	267,942,747	35.0
	Sunuapa, 1978	12,887	2		5	1,260	22,663,065	32.8
	[illegible], 1982	15,613	1		11	57	104,430	39.8
	Tintal, 1968	5,904	4		2	200	4,260,569	22.0
	Topen, 1978	11,172	2		1	1,680	2,556,011	25.4
	Tupilco, 1959	9,685	36	31	34	2,433	47,150,349	27.0
	Bellota, 1982	17,056	9		3	38,725	18,879,605	41.0
	Cardenas, 1979	17,548	26		19	103,074	131,966,949	38.0
	Chiapas, 1979	12,136	5		2	9,423	23,978,820	42.0
	Fenix, 1979	17,876	4		3	9,787	21,819,563	40.0
	Iris, 1979	14,432	8			3,998	10,269,576	39.2
	Jujo, 1980	17,548	18		1	121,200	91,548,208	32.0
	Caparroso, 1982	18,368	1			235	242,278	41.2
	Tecominoacan, 1983	19,519	1		4	10,707	7,636,304	37.5
	Jolote, 1983	18,119	1			1,201	1,169,462	39.4
	Artesa Ter., 1984		1	1	1	570	365,084	28.0
	Carmito, 1980	10,050	1			1,738	1,447,052	45.6
	Eden, 1983	17,590	1		1	5,375	3,380,252	38.5
	Samaria Ter., 1965	4,920	10	6	7	710	5,748,790	13.9
	Other		16		21	33,850	122,513,264	
GULF OF CAMPECHE	● Cantarell, 1976	8,528	63		12	945,417	1,815,507,659	21.3
	● Abkatun, 1978	11,800	25		10	413,608	552,462,066	30.0
	● Ku, 1979	10,000	8		7	176,403	235,211,084	22.0
	● Pol, 1979	12,600	8			104,411	148,762,978	35.0
	● Chuc, 1982	13,100	1		1	25,378	27,698,915	35.0
	● [illegible], 1984		1		1	3,100	1,809,777	35.0
	Total Mexico		1,779	1,958	1,352	2,664,868	12,357,306,345	

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
MOROCCO(e)	Hancha, 1957	3,000				290	3,268,000	40.0
	Other						12,554,000	
	Total Morocco		—	...	...	**290**	**15,822,000**	
NETHERLANDS								
UNION	● Helm, 1979	4,400	1	6		4,549	4,352,802	18.3
	● Helder, 1980	4,800		12		8,743	9,572,730	21.9
	● Hoorn, 1981	5,000		6		10,577	9,853,005	26.0
CONOCO	Kotter, 1980	6,500	7			*5,577	1,335,500	30.8
ROYAL DUTCH SHELL GROUP	DeLier-Munster, 1955	5,200		33		647	16,269,902	33.2
	Berkel, 1954	NA		11		1,870	2,382,730	32.1
	Ysselm-Ridderkerk, 1956	5,200		77	9	4,571	84,938,543	18.0
	Pynacker, 1955	NA		5		150	5,569,063	36.3
	Wassenaar, 1956	4,200		38	3	1,931	44,707,188	18.6
	Zoetermeer, 1957	3,200		22		505	9,294,445	16.4
	Schoonebeek, 1943	2,500		356		12,779	222,177,883	24.8
	Other			70	21	731	4,345,847	
*Conoco Netherlands net only.	**Total Netherlands**			**644**	**33**	**52,630**	**414,799,638**	
NEUTRAL ZONE								
AOC	● Khafji, 1961	4,400-10,300	111		11	243,000	2,173,000,000	28.2
	● Hout, 1969	5,300-10,500	48		21	23,000	248,000,000	33.0
GETTY & KOC	Wafra, 1953	1,100- 7,000	2	310	80	85,000	1,254,000	18.9-23.5
	S. Fuwaris, 1963	6,300		6	3	2,500	21,000,000	25.0
	S. Umm Gudair, 1966	8,900	–	16	2	43,000	287,000,000	24.3
	Total Neutral Zone		**161**	**332**	**117**	**396,500**	**3,983,000,000**	
NEW ZEALAND								
SHELL-BP-TODD	● Kapuni, 1959	10,318-11,775		9	3		34,000,000	54.0
MAUI DEVELOPMENT LTD.	● Maui, 1969	8,615-11,068		11	3		15,000,000	58.0
PCNZ	McKee, 1981 Pouri, 1983	7,848- 8,251		4	2			36.0
	Kaimiro, 1982	11,856-11,900		1				
	Tuhua, 1983	8,490- 7,893		2			800,000	42.0
	Pukemai, 1983	8,540- 8,631		1	1			42.0
	Toe Toe, 1984	7,388- 8,195						38.7
	Total New Zealand			**28**	**9**	**17,000**	**49,800,000**	
NIGERIA								
AGIP-PHILLIPS	Akri, 1977	9,600-10,600	9			13,579	53,683,940	39.9
	Akri West, 1975	9,900-10,200			2		482,258	31.4
	Ashaka, 1968	9,700-12,000	1			768	1,839,988	41.0
	Beniku, 1974	12,000	1		1	1,097	3,014,069	44.3
	Ebegoro, 1976	11,500-12,000	8		2	9,247	51,492,586	35.7
	Ebocha, 1965	8,000-10,900	15		3	11,368	101,265,649	38.5
	Idu, 1973	7,750-10,700			5		23,862,581	28.0
	Kwale, 1968	10,000-11,500	3		2	1,974	2,326,151	44.3
	M'Bede, 1966	7,300- 9,400	12		3	14,838	143,941,540	41.1
	Obama, 1975	11,600-14,300	12		1	18,975	76,696,573	38.2
	Obiafu, 1973	9,300-12,200	13		3	12,678	68,885,921	41.3
	Obrikom, 1973	8,000-10,000	7			7,350	48,347,523	41.5
	Ougri, 1972	12,500	3		2	1,378	9,031,399	44.8
	Ogbogene, 1976	10,000-12,000	1		2	83	3,294,764	37.0
	Ogbogene W., 1981	13,000	1			99	348,367	56.2
	Okpai, 1968	10,000-12,000	8		1	637	13,676,269	42.3
	Omoku West, 1975	11,500	1			1,331	4,268,269	35.0
	Oshi, 1974	9,600-11,300	14			12,474	53,869,308	39.5
	Tebidaba, 1975	10,300-13,300	14		1	19,543	94,998,218	35.5
	Umuoru, 1975	14,100	3			2,930	2,511,463	43.0
	Agwe, 1977	10,800	1			1,315	1,522,830	55.0
	Clough Creek, 1977	10,000-12,400	10		1	9,291	11,637,821	43.0
	Beniboye North		9			3,050	552,077	34.3
PHILLIPS	Gilli-Gilli, 1967	7,600-14,000	2		1	1,093	2,372,282	47.4
ASHLAND	Izombe-Ossu, 1974	9,500	16		6	12,179	39,893,852	43.0
	● Akam, 1980	7,000	9			11,174	6,482,197	36.0
ELF	Aghigo, 1972		13		6	5,954	19,017,945	25.7
	Okpoko, 1967		13		7	7,979	21,578,110	23.0
	Obodo-Jatumi, 1966		15		7	13,218	50,331,407	31.1
	Upamini, 1965		8		7	2,865	12,732,769	19.8
	Obagi, 1964		51		4	64,434	304,050,581	24.0
	Erema, 1972		2		2	2,148	5,632,134	35.4
GULF	Abiteye, 1970	5,750- 9,400	11		8	11,296	53,167,333	37.8
	● Delta, 1965	5,600- 9,500	22		5	15,966	147,432,784	34.0
	● Delta South, 1965	7,100-10,179	18		9	23,651	233,668,790	38.6
	● Isan, 1970	5,900- 9,000						39.4
	Makaraba	7,100-12,005	20		6	21,397	63,810,529	31.5
	● Malu, 1969	4,800- 6,300	12		6	17,954	81,893,314	40.0
	● Mefa, 1965	8,570-12,030	4		1	4,084	12,500,905	37.1
	● Meji, 1965	5,200-10,900	19		3	14,713	129,105,971	32.9
	● Meren, 1965	5,000- 7,500	31		19	51,116	420,462,798	31.3

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	• Okan, 1964	5,500- 9,245	45		22	41,230	395,594,585	36.0
	• Parabe Eko, 1968	4,500- 8,200	14		9	6,257	92,730,533	36.7
	Utonana, 1971	7,400- 9,165	2		3	936	7,881,679	35.6
	• W. Isan, 1971	7,825-10,229	6		3	3,178	31,549,166	38.1
	Yoria South, 1974	11,389-12,635			2		834,040	
	Isike, 1975	6,300- 7,600	3		1	2,462	3,949,111	44.0
	Robertkiri, 1964	11,484-13,190	11		1	2,185	2,942,313	
	• Tapa, 1978	8,150-10,842	10			10,062	15,068,782	36.0
MOBIL	• Adua, 1967	6,970	4		1	6,513	35,929,006	30.3
	• Asabo, 1966	5,600	6		4	15,207	143,143,363	37.4
	• Ekpe, 1966	8,200	5		3	18,088	173,661,727	30.3
	• Ekpe-WW, 1977	6,810	9		1	9,644	24,703,879	30.3
	• Eku, 1966	5,420	4		2	2,219	14,044,246	30.8
	• Enang, 1968	6,600	19		2	25,077	102,058,500	35.1
	• Etim, 1968	6,200	9			16,134	89,546,945	32.9
	• Idoho, 1966	9,020	2			946	26,944,792	30.8
	• Inim, 1966	5,850	8		1	18,563	123,660,196	37.8
	• Mfem, 1967	5,200	3			4,515	20,261,316	36.1
	• Ubit, 1968	5,400	34		3	24,151	153,527,309	36.1
	• Unam, 1968	5,180	6		3	5,535	34,947,995	33.5
	• Utue, 1966	5,700	5		2	8,533	60,025,090	36.8
	• Isobo, 1968	4,345	2		2	2,334	5,417,723	30.8
	• Iyak	NA	7		1	22,314	13,714,294	38.7
	Asabo D		1			1,405	573,042	
INPEX	Ogharefe, 1973	9,900	7		5	5,751	23,417,871	47.4
SHELL (MIDWEST)	Ugh-Ogini, 1964	5,860	4			1,487	18,511,651	19.0
	Ugh-Uzere-East, 1960	8,500	6			5,084	82,124,077	23.0
	Ugh-Uzere-West, 1964	8,500	4			2,352	34,530,804	23.0
	Ugh-Olomoro, 1963	7,000-10,000	11			25,636	262,180,086	22.0
	Ugh-Oweh, 1964	12,300	6			4,641	59,896,808	28.0
	Ugh-Kokori, 1960	8,000- 9,800	4			19,793	295,907,085	42.0
	Ugh-Afiesere, 1966	8,000- 9,000	13			12,185	105,487,739	22.0
	Ugh-Eriemu, 1961	12,500	12			4,507	36,570,984	26.0
	Ugh-Ughelli-East, 1959	11,800	6			3,424	86,105,680	35.0
	Ugh-Ughelli-West, 1963	7,400-10,200	2			2,320	29,469,014	21.0
	Ugh-Utorogu, 1964	9,000	7			8,813	123,498,492	25.0
	Ugh-Oroni, 1964	12,000	1			1,936	24,981,985	22.0
	Ugh-Warri River, 1961	12,264	1			1,119	13,985,944	31.0
	Ugh-Evwreni, 1968	12,900	4			1,274	32,722,332	28.0
	Ugh-Isoko, 1960	NA	1			479	5,172,300	19.0
	Forc-Odidi, 1967	10,980	6			18,899	185,084,360	37.0
	Forc-Opukushi, 1963	7,823	4			27,097	93,523,666	29.0
	Forc-Jones Creek, 1967	7,000- 9,000	11			28,242	362,913,571	29.0
	Forc-Opuama, 1973	NA	1			4,021	22,418,782	41.0
	Forc-Egwa, 1967	9,350	8			10,170	171,298,361	37.0
	Forc-Forcados Yokri, 1968	10,859	39			58,851	470,886,438	22.0
	Forc-Batan, 1968	11,000	3			4,529	51,965,451	27.0
	Forc-Escravos Beach, 1969	9,931	1			6,044	50,701,224	36.0
	Forc-Otumara, 1969	8,176	7			25,900	131,605,207	25.0
	Forc-Saghara, 1970	8,590	1			4,949	27,751,626	31.0
	Forc-Ajuju, 1970	13,324				697	9,251,033	27.0
	Forc-Benisede, 1973		4			28,056	81,013,702	23.0
	Node-Sapele, 1970	12,788	11			16,088	94,909,399	42.0
	Node-Oben, 1972	12,036	17			34,725	91,797,674	40.0
	Forc-Opukushi N., 1977	NA				855	1,981,305	30.0
	Abura		3			4,363	13,219,197	44.8
	Rapele					2,243	21,159,563	44.4
SHELL (EAST)	Phi-Bomu, 1958	6,500- 7,500	10			7,576	341,128,647	36.0
	Phi-Imo River, 1959	5,800-10,000	24			28,784	429,146,690	32.0
	Phi-Nkali, 1963	12,000	1			125	27,177,627	42.0
	Phi-Elelenwa, 1959	11,000	1			2,412	28,676,633	39.0
	Phi-Umuechem, 1969	5,800-10,700	5			8,411	141,408,059	36.0
	Phi-Apara, 1960	9,000	4			2,835	20,948,592	36.0
	Phi-Bodo-West, 1959	9,700	1			5,283	72,880,925	29.0
	Phi-Afam, 1956	6,000	8			4,813	54,948,739	45.0
	Phi-Yorla, 1970	11,917	8			5,651	54,309,634	44.0
	Phs-Bonny, 1959	12,254	11			6,491	81,447,212	36.0
	Phs-Cawthorne Channel, 1963	11,000	17			49,276	229,526,064	38.0
	Phs-Ekulama, 1958	10,483	16			32,049	161,807,797	32.0
	Phs-Soku, 1958	11,500	8			7,685	97,859,543	31.0
	Phs-Orubiri, 1971	NA	2			4,986	12,723,885	38.0
	Egb-Oguta, 1965	10,300	8			9,550	120,599,632	46.0
	Eade-Utapate South, 1974	NA	5			8,463	29,674,853	44.0
	Eade-Opobo South, 1974	NA	6			9,642	10,394,824	44.0
	Korokoro		3			3,732	78,909,154	34.3
	Otamini		1			818	12,101,386	21.8
	Ugada		1			193	961,689	
	Ania		8			6,435	79,511,833	38.2
	Akpor		1			588	1,702,107	27.5
	Alakiri		4			1,926	58,519,175	38.2
	Assa		2			987	4,546,227	20.7
	Egbema West		8			[illegible]	12,302,416	42.2
	Ebubu		2			[illegible]	18,493,256	22.2
	Egbema		[illegible]			[illegible]	46,498,422	35.5

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo 1985	Cumulative bbl to July 1, 1985	°API gravity
	Cesa-Nun River, 1960	NA	4			4,127	27,899,099	39.0
	Cesa-Etelebou, 1971	12,000	9			17,169	108,867,160	33.0
	Cesa-Kolo Creek, 1960	12,000	14			22,424	108,869,248	42.0
	Cesa-Diebu Creek, 1966	NA	17			12,363	92,540,387	43.0
	Pht-Isimiri, 1964	5,900-11,000	4			2,776	35,453,724	28.8
	Pht-Omne, 1965	10,384	3			819	8,198,220	29.0
	Pht-Obigbo-North, 1963	6,500-10,000	23			15,404	156,149,830	22.0
	Pht-Ajokpori, 1967	NA	1			854	4,268,953	29.0
	Pht-Agbada, 1960	8,000-12,000	24			21,887	154,933,779	32.1
	Pht-Akuba, 1967	NA	1			289	3,762,308	29.0
	Cesa-Adibawa, 1967	11,950	7			16,984	61,346,818	26.0
	Cesa-Adibawa NE, 1973	NA	2			4,541	11,672,333	26.0
	Cesa-Ubie, 1961	14,380				5,385	26,186,447	28.0
	Pht-Obeakpu, 1975	NA	1			1,280	12,973,574	45.0
	Cesa-Nembe Creek, 1973	NA	17			56,573	134,499,600	35.0
	Pht-Akaso, 1979	NA	1			1,390	1,520,097	30.0
TEXACO-CHEVRON	• Pennington, 1965	5,000-10,400	3		8	1,755	22,436,845	37.5
	• Middleton, 1972	5,000- 7,000	7		3	2,307	12,353,758	37.5
	• North Apoi, 1973	4,000- 8,100	5		23	18,349	121,110,595	36.5
	• Funiwa, 1978	5,000- 7,000	3		16	13,296	15,594,115	37.5
	• Sengana, 1967		2			395	444,733	38.5
	Total Nigeria		**1,153**	...	**247**	**1,487,748**	**10,512,023,309**	
NORWAY PHILLIPS	• Ekofisk, 1968	10,000	41		5	132,641	822,902,957	41.1
	• West Ekofisk, 1970	10,300	10			11,399	75,227,718	43.9
	• Cod, 1968	9,500	6			3,903	16,942,791	55.0
	• Tor, 1970	10,000	10		3	17,741	103,194,923	38.0
	• Albuskjell, 1972	10,400	14		4	9,380	44,641,535	45.0
	• Edda, 1972	10,480-10,600	7			3,847	20,990,153	41.5
	• Eldfisk, 1970	9,350-10,000	29		3	62,333	167,731,582	37.6
MOBIL	• Statfjord, 1974	7,700	35			*414,064	570,800,000	39.0
AMOCO	• Valhall, 1972	8,200	11		6	52,153	37,492,046	35.0
CONOCO	• Murchison, 1975	9,900	14			†37,646	36,983,700	39.0
	Total Norway		**178**	...	**21**	**755,907**	**1,896,907,405**	
OMAN PDO	Lekhwair, 1968	4,352	10	18	26	14,580	41,568,000	37.8
	Shibkah, 1976	2,591	2			484	477,000	25.7
	Natih, 1963	4,788	12	19	25	27,883	318,599,000	31.0
	Fahud, 1964	2,499	26	80	77	69,056	688,315,000	32.7
	Al Huwaisah, 1969	5,320	1	34	3	19,247	149,766,000	37.0
	Ghaba North, 1972	2,227	1	8	5	7,101	39,673,000	35.8
	Saih Nihaydah, 1972	8,700	1	12	5	24,763	120,929,000	39.0
	Saih Rawl, 1973	9,826	7	7	8	9,693	78,408,000	41.1
	Qarn Alam, 1972	1,354		4	2	1,749	17,783,000	14.8
	Habur, 1975	5,800		1	1	289	4,076,000	16.2
	Mahjour, 1979	11,700	1		3	591	1,363,000	37.2
	Zauliyah, 1981	8,177	6		2	9,227	3,664,000	45.5
	Rima, 1979	3,247	9	21	1	66,037	44,086,000	32.8
	Birba, 1978	8,528	2		1	6,919	5,604,000	33.4
	Marmul, 1977	5,087		137	4	48,180	70,344,000	22.0
	Rahab, 1977	3,237		13	6	2,164	2,516,000	22.0
	Qaharir, 1978	4,536		23	3	7,428	14,227,000	30.6
	Qata, 1979	4,707		10	3	2,057	1,749,000	26.2
	Yibal, 1962	8,465	26	98	7	125,148	473,211,000	40.2
	Burhaan, 1984	4,011	1			2,428	371,000	36.7
	Al Ghubar, 1974	1,916	4	1		4,906	317,000	23.5
	Anzauz, 1984	7,098	1			5,044	988,000	47.8
	Hasirah, 1984	8,706			1	2,082	191,000	48.8
	Suwaihat, 1982	6,452	5		2	6,604	601,000	36.0
	Banja, 1984	5,697	2		1	1,855	227,000	44.5
	Rasha, 1982	4,310		4		1,032	243,000	22.3
	Nimr, 1980	3,296		5		862	26,000	21.3
	Karim West, 1982	3,546		6	2	4,875	593,000	23.5
	Amal/Amal South, 1973	4,638		6	3	4,019	1,472,000	22.5
	Qaharir East, 1978	4,936		1	2	182	459,000	30.6
ELF GROUP	Sahmah, 1978	12,400	5			7,262	17,582,000	45.1
OCCIDENTAL PETROLEUM	Safah, 1983	6,500	11			273	621,000	37.8
	Total Oman		**133**	**508**	**193**	**484,020**	**2,100,139,000**	
PAKISTAN UNION TEXAS	Khaskeli, 1981	3,500	6		2	3,447	4,094,936	39.0
	Laghari, 1983	2,600	5		1	7,305	2,543,970	42.0
	Other				11			31.4-46.0
PAKISTAN PETROLEUM	Adhi, 1978	9,118- 9,190	3			1,090	1,007,684	48.5
OGDC	Toot, 1968	14,900	8		3	2,338	7,802,619	38.0
	Fimkassar, 1982	11,465	1			31	12,138	39.0
	Tando Alam, 1984	8,203	4			3,515	994,809	40.9

*Norway's 84.09% share of production. †Norway's production share.

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells			B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
			Flow	Artificial lift	Shut-in			
	Cesw-Nun River, 1960	NA	4			4,127	27,899,099	39.0
	Cesw-Etelebou, 1971	12,000	9			17,169	108,867,160	33.0
	Cesw-Kolo Creek, 1960	12,000	14			22,424	108,869,248	42.0
	Cesw-Diebu Creek, 1966	NA	17			12,363	92,540,387	43.0
	Phi-Isimin, 1964	5,900-11,000	4			2,776	35,453,724	28.8
	Phi-Onne, 1965	10,384	3			819	8,198,220	29.0
	Phi-Obigbo-North, 1963	6,500-10,000	23			15,404	156,149,830	22.0
	Phi-Ajokpori, 1967	NA	1			854	4,268,953	29.0
	Phi-Agbada, 1960	8,000-12,000	24			21,887	154,933,779	32.1
	Phi-Akuba, 1967	NA	1			289	3,762,308	29.0
	Cesw-Adibawa, 1967	11,950	7			16,984	61,346,818	26.0
	Cesw-Adibawa NE, 1973	NA	2			4,541	11,672,333	26.0
	Cesw-Ubie, 1961	14,380				5,385	26,186,447	28.0
	Phi-Obeakpu, 1975	NA	1			1,280	12,973,574	45.0
	Cosw-Nembe Creek, 1973	NA	17			56,573	134,499,600	35.0
	Phs-Akaso, 1979	NA	1			1,390	1,520,097	30.0
TEXACO-CHEVRON	● Pennington, 1965	5,000-10,400	3		8	1,755	22,436,845	37.5
	● Middleton, 1972	5,000- 7,000	7		3	2,307	12,353,758	37.5
	● North Apoi, 1973	4,000- 8,100	5		23	18,349	121,110,595	36.5
	● Funiwa, 1978	5,000- 7,000	3		16	13,296	15,594,115	37.5
	● Sengana, 1967		2			395	444,733	38.5
	Total Nigeria		1,153	...	247	1,487,748	10,512,023,309	

NORWAY

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
PHILLIPS	● Ekofisk, 1968	10,000	41		5	132,841	822,902,957	41.1
	● West Ekofisk, 1970	10,300	10			11,999	75,227,718	43.9
	● Cod, 1968	9,500	6			3,903	16,942,791	55.0
	● Tor, 1970	10,000	10		3	17,741	103,194,923	38.0
	● Albuskjell, 1972	10,400	14		4	9,380	44,641,535	45.0
	● Edda, 1972	10,480-10,600	7			3,847	20,990,153	41.5
	● Eldfisk, 1970	9,350-10,000	29		3	62,333	167,731,582	37.6
MOBIL	● Statfjord, 1974	7,700	35			*414,064	570,800,000	39.0
AMOCO	● Valhall, 1972	8,200	12		6	62,153	37,492,046	35.0
CONOCO	● Murchison, 1975	9,900	14			†37,646	36,983,700	39.0
	Total Norway		178	..	21	755,907	1,896,907,405	

*Norway's 84.09% share of production. †Norway's production share.

OMAN

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
PDO	Lekhwair, 1968	4,352	10	18	26	14,580	41,568,000	37.8
	Shibkah, 1976	2,591	2			484	477,000	25.7
	Natih, 1963	4,788	12	19	25	27,883	318,599,000	31.0
	Fahud, 1964	2,499	26	80	77	69,056	688,315,000	32.7
	Al Huwaisah, 1969	5,320	1	34	3	19,247	149,766,000	37.0
	Ghaba North, 1972	2,227	1	8	5	7,101	39,673,000	35.8
	Saih Nihaydah, 1972	8,700	1	12	5	24,763	120,929,000	39.0
	Saih Rawl, 1973	9,826	7	7	8	9,693	78,408,000	41.1
	Qarn Alam, 1972	1,354		4	2	1,749	17,783,000	14.8
	Habur, 1975	5,800		1	1	289	4,076,000	16.2
	Mahjour, 1979	11,700	1		3	591	1,363,000	37.2
	Zauliyah, 1981	8,177	6		2	9,227	3,664,000	45.5
	Rima, 1979	3,247	9	21	1	66,037	44,086,000	32.8
	Birba, 1978	8,528	2		1	6,919	5,604,000	33.4
	Marmul, 1977	5,087		137	4	48,180	70,344,000	22.0
	Rahab, 1977	3,237		13	6	2,164	2,516,000	22.0
	Qaharir, 1978	4,536		23	3	7,428	14,227,000	30.6
	Qata, 1979	4,707		10	3	2,057	1,749,000	26.2
	Yibal, 1962	8,465	26	98	7	125,148	473,211,000	40.2
	Burhaan, 1984	4,011	1			2,428	371,000	36.7
	Al-Ghubar, 1974	1,916	4	1		4,906	317,000	23.5
	Anzauz, 1984	7,098	1			5,044	988,000	47.8
	Hasirah, 1984	8,708			1	2,082	191,000	48.8
	Suwaihat, 1982	6,452	5		2	6,604	601,000	36.0
	Banja, 1984	5,697	2		1	1,855	227,000	44.5
	Rasha, 1982	4,310		4		1,032	243,000	22.3
	Nimr, 1980	3,296		5		862	26,000	21.3
	Karim West, 1982	3,546		6	2	4,875	593,000	23.5
	Amal Amal South, 1973	4,638		6	3	4,019	1,472,000	22.5
	Qaharir East, 1978	4,936		1	2	182	459,000	30.6
ELF GROUP	Sahmah, 1978	12,400	5			7,262	17,582,000	45.1
OCCIDENTAL PETROLEUM	Safah, 1983	6,500	11			273	621,000	37.8
	Total Oman		133	508	193	484,020	2,100,139,000	

PAKISTAN

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	Flow	Artificial lift	Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
UNION TEXAS	Khaskeli, 1981	3,500	6		2	3,447	4,094,936	39.0
	Laghari, 1983	2,600	7		1	7,305	2,543,970	42.0
	Other				11			31.4-46.0
PAKISTAN PETROLEUM	Adhi, 1978	9,118- 9,190	3			1,090	1,007,684	48.5
OGDC	Toot, 1968	14,900	4		3	2,338	7,802,619	38.0
	Fimkassar, 1982	11,468	2			31	12,138	39.0
	Tando Alam, 1984	[illegible]	4			3,515	994,809	40.9

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
SPAIN	**SHELL ESPANA**	● Amposta Marino North, 1970	10,000	2	...	1	1,500	54,269,246	37.0
	CHEVRON	● Casablanca, 1975	8,000	5	...	...	30,400	51,233,202	34.0
	AMOSPAIN	Ayoluengo, 1964	4,000	...	32	8	1,613	13,197,000	37.0
	SHELL/CAMPSA	● Castellon B., 1972	9,000	3			6,000	13,888,162	35.0
	ENIEPSA	● Dorado, 1975	6,700	1	...	1	7,960	16,375,263	21.0
		● Salmonete, 1984	12,600	...		1	3,140	1,113,239	44.0
		● Angula, 1984	12,000	...	...	1	106	46,630	33.0
		Total Spain		11	32	12	**50,719**	**150,122,742**	
SURINAME	**STAATSOLIE**	Tambaredjo	984		23	2	1,040	565,693	15.8
		Total Suriname	**984**	...	23	2	**1,040**	**565,693**	**15.8**
SYRIA	**S.P.C.**	Alian, 1974	5,900	3	8		1,170	5,465,606	19.0
		Gbebeh, 1976	2,300	12	17		3,000	3,385,341	18.0
		Jebisseh, 1968	2,000- 3,300	23	112		7,630	21,649,169	18.0
		Karchok, 1968	6,500	3	83		24,700	123,554,790	20.0
		Rumilan, 1962	6,500	8	39		6,103	40,510,336	24.0
		Soudie, 1959	6,500	4	449		107,490	618,252,613	24.0
		Tichrine, 1976	2,600	4	16		2,555	3,044,838	18.0
		Other	...	6	60		9,035	14,268,964	...
		Total Syria		**63**	**784**		**161,683**	**830,149,657**	
THAILAND	**UNION OIL**	● Erawan, 1973	7,000	72		15	6,864	8,329,663	54.6
		● Baanpot, 1980	7,000	10		...	1,262	907,222	54.6
		● Platong, 1976	8,500	27		4	2,711	490,697	59.1
		● Satun, 1980	8,500	48		2	2,581	467,261	55.1
	THAI SHELL	Sirikit, 1981	5,258- 5,976	26		3	19,779	10,687,700	41.0
		Sirikit West, 1983	5,500	1			677	45,500	41.0
		Total Thailand		**184**	...	**24**	**33,874**	**20,938,043**	
TRINIDAD	**AMOCO**	● Teak, 1971	15,191	12	40		43,475	194,365,940	29.3
		● Samaan, 1971	11,780	9	26		18,040	161,404,624	36.8
		● Poui, 1974	11,650	11	18		22,971	127,251,807	34.0
		● Cassia, 1973	12,700	6	...		8,915	4,426,562	45.0
	T.N.A.	● Soldado, 1955	11,000	60	254		37,618	428,210,576	24.8
		Fortin Offshore (FOS), 1954	...	2	11		335	6,740,594	...
	TRINIDAD-TESORO	Palo Seco/Erin/McKenzie, 1926	12,718	39	461	...	8,091	108,934,506	20.2
		Fyzabad/Apex/Quarry, 1920-38	11,000	8	321	...	4,135	166,973,836	21.5
		Coora/Quarry, 1936	14,000	5	197	...	2,544	89,318,074	23.8
		● Galeota, 1963	6,304	...	48	...	4,199	12,239,836	25.5
		Other	...	21	332	...	4,660	64,893,324	...
	TEXACO	● Brighton, 1908	700- 7,500	5	61	...	464	72,034,891	32.8
		Barrackpore, 1911	1,300-11,100	9	34	...	1,126	28,845,987	29.9-41.2
		Guayaguayare, 1902	500-10,750	1	138	...	1,452	85,008,808	33.7
		Forrest Reserve, 1913	500-11,000	...	...	...	10,608	256,103,731	23.0
		Oropouche, 1944	2,700- 9,100	1	28	...	220	6,472,979	38.6
		Palo Seco, 1929	250-12,700	11	72	...	1,960	91,158,811	21.2
		Trinity, 1956	1,400- 9,700	...	15	...	266	14,934,230	32.2
		Other	...	14	307	...	375	56,877,959	...
	TRINTOC	Area IV & Guapo, 1913	10,626	17	47	...	1,284	37,523,367	25.5
		Parrylands, 1913-18	10,626	21	76	...	1,680	38,166,255	30.2
		Point Fortin C & W, 1907-16	10,626	30	95	...	2,678	38,413,421	22.0
		Point Fortin E., 1929	11,000	2	52	...	1,028	25,895,074	22.2
		Penal, 1936	11,067	17	64	...	1,321	61,050,163	22.4
		Catshill, 1950	9,693	1	36	...	391	22,702,812	38.3
		Other	...	14	26	...	910	42,449,415	...
	P.C.O.L	All fields	...	3	79		520	19,909,091	
		Total Trinidad		**319**	**2,838**	...	**181,266**	**2,262,306,673**	
TUNISIA	**ELF-ETAP***	● Ashtart	10,500	6	8	1	22,490	150,100,000	29.8
	ELF-Serept†	Douleb/Semmama	1,500- 2,500		14	...	908	16,800,000	39.3
		Tamesmida	2,500		3		278	1,800,000	36.8
	CFTP	Sidi El Itayem, 1971	7,500- 7,800		16	2	2,941	18,753,000	44.0
		Other	...	...			...	655,000	
	PETROFINA/AGIP/ETAP	Laarich, 1979	8,031	1			143	166,917	43.3
		Makhrouga, 1980	7,893	3			2,357	1,463,500	45.5
		Debbech, 1980	8,202	1			131	151,784	43.4
	SHELL/AGIP/ETAP	● Tazerka, 1979	4,111- 4,232	4			7,176	8,504,075	30.0
	AGIP-TUNISIA (Sitep)	El Borma, 1964	8,250- 8,900	49	34	15	73,779	430,611,743	42.5
		Chouech es Saida, 1971	12,600	1			382	2,085,717	42.9
		Total Tunisia		**65**	**75**	**18**	**110,585**	**631,091,736**	

*Elf Aquitaine Tunisie-ETAP. †Elf Aquitaine Tunisie-Serept.

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
TURKEY	**TURKSE SHELL**	Barbes, 1971	...	...	14	2	1,675	14,005,174	29.7
		Beykan, 1964	...	...	28	4	3,489	55,580,835	33.2
		Kayakoy, 1960	...	...	15	5	1,680	18,105,430	38.2
		Kayakoy West, 1964	...	...	13	4	2,126	26,576,986	34.7
		Sahaban, 1965	...	...	9	4	396	12,362,967	34.5
		Malatepe, 1970	...	...	11	...	1,070	6,139,301	32.7
		Kurkan, 1963; and Kurkan S., 1965	...	...	24	2	3,109	52,270,583	31.4-34.5
		Sıncan, 1979	...	...	6	...	581	1,973,960	31.4
		Yatır East, 1973	...	...	4	6	674	4,569,824	30.9
		Yenikoy East, 1974	...	...	2	...	324	3,494,232	31.3
		Other	...	...	4	2	491	5,401,871	...
	MOBIL	Selmo, 1964	5,800	1	18	1	5,617	60,749,000	34.2
		Bulgurdağ	4,500	...	...	...	...	2,400,000	...
	TPAO	Raman, 1940	4,500	...	95	6	4,707	44,280,457	18.7
		Batı Raman, 1961	4,200	...	69	5	1,826	31,875,053	13.3
		Garzan, 1956	4,700	...	19	1	1,081	31,651,915	26.2
		Germık, 1968	6,500	...	4	...	117	2,930,583	18.8
		Mağrıp, 1961	5,700	...	12	1	305	14,194,709	18.4
		Silivanka, 1962	8,200	...	10	...	788	6,854,371	23.0
		Beycayır, 1976	7,700	...	1	...	43	146,886	26.1
		Celiklı, 1964	10,500	...	4	...	394	923,200	35.2
		Sezgın, 1970	5,600	...	...	...	...	87,559	17.0
		Oyuktas, 1972	7,600	...	...	...	...	592,005	31.0
		Devecatak, 1973	4,800	...	1	...	40	196,047	37.0
		Kuzey Osmancık, 1971	3,800	...	2	...	314	1,784,650	37.6
		Adıyaman, 1971	5,800	...	12	2	372	7,448,185	27.6
		Güney Adıyaman, 1977	5,000	...	...	...	...	115,836	20.4
		Kuzey Adıyaman, 1977	9,500	...	1	...	5	58,957	32.0
		Bolükyayla, 1977	10,300	...	...	...	...	167,663	35.0
		Sarıcak, 1973	5,250	...	4	...	210	2,329,105	31.5
		Güney Sarıcak, 1973	5,250	...	6	1	248	3,343,730	31.5
		Yenikoy, 1973	6,400	...	10	1	975	7,313,839	31.4
		Güney Kayakoy, 1976	8,600	...	2	1	152	1,674,410	30.4
		Sivritepe, 1977	8,200	...	1	...	32	456,434	33.4
		Camurlu, 1976	5,600	...	5	1	115	569,686	12.2
		Ikiztepe, 1976	4,900	...	...	...	...	88,051	11.3
		Güney Sahaban, 1978	5,450	...	6	...	484	1,474,856	33.2
		Güney Dincer, 1981	5,350	...	17	1	1,328	3,478,508	16.7
		Selmo B., Selmo, 1981	5,500	...	2	...	213	274,864	34.0
		Mehmetdere, 1982	6,700	...	1	...	35	141,475	31.0
		Kartaltepe, 1982	6,550	...	3	...	391	435,260	32.0
		Cemberlitas, 1983	9,500	...	10	...	4,936	2,104,062	30.5
		Alcik	6,500	...	1	...	24	27,908	32.0
		Cukurtas, 1985	...	...	1	...	400	36,694	36.0
		B. Kozluca, 1985	...	...	1	...	80	2,023	12.0
	***ERSAN**(a)	Kahta, 1958	3,500		...	.	...	3,945,805	11.5
		Total Turkey		1	**448**	**50**	**40,847**	**434,544,949**	
UNITED KINGDOM	**AMOCO**	● Montrose, 1969	8,200	6	9	1	14,014	63,678,713	40.5
		● NW Hutton, 1975	12,000	5	12	...	50,483	41,070,486	36.0
	***BPPD (UK LAND)**	Wytch Farm, Bridport Sands, 1974	2,910	...	8	4	3,044	5,977,000	37.0
		Wytch Farm, Sherwood Sandstone, 1977	5,115	1	1	4	1,904	2,269,000	38.0
	BRITOIL	● Thistle, 1973	9,000	28	...	4	76,631	260,628,566	38.0
		● Beatrice A, 1976	6,750	15	16	1	38,825	46,636,110	39.0
		● Beatrice B	6,500	7	7	...	18,824	6,385,355	39.5
		● Deveron, 1972	9,000	2	...	...	6,008	1,639,532	38.2
	BP	● Forties, 1970	7,000	43	...	12	414,900	1,498,600,000	37.0
		● Buchan, 1974	8,700	6	...	2	39,000	38,460,000	33.0
		● Magnus, 1974	9,500	9	...	...	124,800	78,000,000	39.0
		East Midlands, 1939	3,500	2	66	67	2,014	24,030,000	36.0
		Kimmeridge, 1960	1,800	...	1	2	144	2,700,000	40.0
	CHEVRON	● Ninian, 1974	10,000	50	1	9	213,000	588,000,000	35.0
	CONOCO GROUP	● Statfjord, 1974	9,500	41	...	...	78,341	89,032,000	38.0
		● Murchison, 1975	9,900	14	...	...	60,241	133,140,000	39.0
		● Dunlin, 1973	9,200	19	...	...	5,360	20,307,000	36.0
		● Hutton, 1973	10,000	10	...	...	11,300	3,897,000	33.0
	HAMILTON BROS.	● Argyll, 1971	9,000- 9,400	7	...		9,400	54,700,000	38.0
		● Duncan, 1980	9,400-10,000	5			14,700	9,000,000	36.0
		● Innes, 1983	12,000-12,300	1			3,700	673,000	45.0
	MARATHON	● North Sea (Brae) South, 1975	12,700-13,437	7			88,490	53,034,441	35.0
	MOBIL	● Beryl, 1972	9,900-11,500	23	11	5	97,966	267,764,779	37.4
	OCCIDENTAL	● Claymore, 1974	8,100	1	21	2	82,812	237,858,000	29.5
		● Piper, 1973	8,100	12	12		183,630	652,777,000	37.2
		● Scapa, 1981	8,100			2		751,000	32.0
	SHELL	● Auk, 1970	NA	10		1	9,221	67,095,808	37.0
		● Brent, 1971	NA	54		12	439,843	739,803,028	38.0
		● Cormorant, 1972	NA	7		6	36,222	51,432,224	36.0
		● Cormorant N., 1974	NA	10		1	100,625	79,039,639	34.9

WORLDWIDE PRODUCTION	Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
	● Dunlin A, 1973	NA	20		4	55,450	210,922,601	33.0
	● Fulmar, 1975	NA			12	129,138	133,126,452	34.0
PHILLIPS	● Maureen (North Sea), 1973	8,000- 8,700	12		2	77,245	48,045,956	36.0
TEXACO NORTH SEA	● Tartan, 1974	10,217-12,614	6	2	2	27,200	34,100,000	37.0-42.0
	● Highlander, 1976	8,759- 9,372	2			18,300	3,300,000	34.0-37.0
UNION OIL	● Heather, 1973	10,800	3	22	1	22,925	56,050,678	33.9
	Total United Kingdom		627		156	2,555,700	5,603,925,368	
VENEZUELA **PDV ANZOA-TEGUI**	Boca, 1971	9,500	7	3	70	1,754	76,425,154	33.0
	Caico Seco, 1946	6,500- 7,300	8	9	88	3,071	64,798,609	37.3
	Chimire, 1948-52	7,000- 7,200	29	22	147	6,041	366,923,883	36.0
	Dacion, 1957	6,700	3	79	61	8,345	215,588,550	21.3
	Elias, 1954	5,000- 6,470	36	35	94	7,941	114,136,952	36.6
	El Roble, 1939	3,500-11,500	20		40	2,359	40,950,575	51.3
	Guara, 1946	5,000-10,000	14	135	212	12,910	557,340,255	26.0
	Inca, 1948	7,250	10	7	33	1,888	30,619,850	32.9
	Leona, 1938	2,200-12,800	11	83	210	9,269	186,968,522	21.4
	La Ceiba, 1946	9,450	18	5	13	2,647	45,379,505	43.8
	Mata, 1954	8,970-10,516	45	27	333	10,667	501,776,684	34.1
	Merey, 1937	5,400- 5,700	8	118	482	4,774	242,288,685	11.4
	Nipa, 1945	6,000- 8,500	14	24	262	13,173	501,135,215	29.5
	Oscurote-Norte, 1952	9,513	4	12	60	665	121,561,918	22.1
	Oficina, 1937	5,900	14	138	332	18,979	771,383,588	21.6
	Soto, 1950	9,500	6		21	2,553	180,601,271	38.9
	Sta. Ana, 1936	8,500	63	2	43	5,605	116,757,853	44.3
	San Joaquin, 1939	6,550	44		54	5,441	88,915,745	53.2
	Sta. Rosa, 1941	8,500	135	5	62	16,434	383,419,995	48.4
	Yopales, 1937	4,600	7	102	145	13,760	151,681,617	22.2
	Zanjas, 1958	13,270	7	1	8	2,364	34,684,665	35.4
	Zapatos, 1955	11,500	17	5	45	4,041	141,085,848	37.0
	Zorro, 1953	11,100	6	4	20	2,467	69,697,530	28.3
	Zulus, 1957	12,710	5	5	12	1,035	22,763,437	39.8
	Zumo, 1954	9,200	3	2	31	831	79,226,943	17.9
	La Ceibita, 1963	9,878	17	6	23	4,135	78,717,760	41.3
	Adjuntas, 1957	5,000			53	145	10,597,009	13.9
	Other		141	219	793	46,664	529,265,351	
PDV MONAGAS	Acema, 1960		13	17	28	33,866	90,186,099	23.9
	Aguasay, 1955	8,100-13,400	5	3	32	7,448	110,190,800	41.7
	Jobo, 1956	3,600- 4,000		202	212	44,526	237,332,929	12.0
	Morichal, 1958	3,312		35	160	5,444	166,170,377	10.6
	Orocual, 1953	2,954	5	18	27	3,656	26,078,371	27.0
	Oritupano, 1950	7,657			65	5,017	171,805,429	22.8
	Pirital, 1958	450- 1,100		51	27	1,653	26,556,036	17.0
	Quiriquire, 1928	7,000- 7,200		39	434	3,680	758,866,291	16.3
	Sta. Barbara, 1941	5,020- 6,500	6	36	274	1,349	165,278,090	29.8
	Tacat, 1953	1,820- 3,670		43	90	1,395	44,666,697	17.0
	Temblador, 1936	3,500- 4,500		18	28	1,488	108,179,096	19.2
	Other		72	212	749	49,353	622,113,712	
PDV ZULIA	Boscan, 1946			272	197	54,554	697,748,058	10.2
	Bachaquero, 1930		25	1,064	2,687	227,747	6,139,672,583	20.2
	Cruces-Manueles, 1916	3,000- 8,000	2	25	105	1,242	173,726,881	30.9
	Cabimas, 1917	2,200	8	392	817	34,870	1,545,820,908	23.4
	Centro, 1959	9,600-11,000	31	78	64	83,742	740,647,050	35.6
	La Concepcion, 1953	3,148- 8,000	2	61	99	3,936	132,606,595	35.1
	La Paz, 1925	4,268- 8,000	9	53	94	12,993	844,394,606	30.5
	Lago, 1959	11,450	30	5	36	13,886	215,099,060	31.7
	Lagunillas, 1926	3,000	76	2,034	3,136	352,887	10,367,858,361	21.5
	Lama, 1957	8,320	116	96	168	104,941	2,412,856,942	32.8
	Lamar, 1958	13,000	35	46	98	65,637	1,050,240,444	34.5
	Mara, 1945	5,240	14	145	275	2,633	405,451,396	22.0
	Mene Grande, 1914	4,130		304	296	6,664	629,106,670	18.4
	Motatan, 1952		6	22	2	16,131	55,730,514	20.3
	Sibucana, 1948	13,450		1	2	668	42,963,342	32.2
	Tia Juana, 1928	3,000	10	2,012	1,035	186,022	3,765,699,507	17.9
	Urdaneta, 1970	10,000	9	125	128	48,492	96,450,732	23.3
	West-Tarra, 1942	4,250- 5,500	8	7	28	1,808	69,934,768	41.3
	Other		51	107	249	52,270	468,255,258	
PDV BARINAS	Hato, 1965	9,550	1	12	5	2,306	41,152,181	27.3
	Maporal, 1957	10,950		1	12	2,454	12,024,669	28.9
	Paez, 1963	NA		26	38	10,067	53,412,504	20.2
	Silvan, 1949	10,860	1	9	8	3,337	45,213,593	29.3
	Silvestre, 1948	8,860		21	27	4,562	132,951,879	25.3
	Sinco, 1953	8,500- 9,100	1	50	33	11,465	249,100,284	24.0
	Other		3	126	146	826	4,797,347	
PDV FALCON	All fields			10	125	224	107,951,582	24.7
PDV GUARICO	Budare, 1958	4,523	7	3	70	3,351	65,495,209	31.5
	Las Mercedes, 1942	4,500	2	24	158	583	133,009,569	22.8
	Ruiz, 1949	4,500		7	35	319	33,063,625	32.0
PDV AMACURO	Tucupita		3		64	665	66,861,223	16.6
	Total Venezuela		1,243	8,860	16,110	1,680,105	39,052,413,236	

*BP Petroleum Development Ltd. took operatorship of Wytch Farm field from BGC in May 1984

WORLDWIDE PRODUCTION		Name of field, discovery date	Depth, feet	No. of wells Flow	No. of wells Artificial lift	No. of wells Shut-in	B/d average first 6 mo. 1985	Cumulative bbl to July 1, 1985	°API gravity
WEST GERMANY	**BAVARIA**	Arlesried, 1964	4,900		120		698	12,564,281	47.0
		Moenchsrot, 1958	4,800				346	11,278,705	36.0
		Other					3,870	33,352,923	
	EMSLAND	Emlichheim, 1964	2,600		1,121		3,654	41,341,920	25.0
		Georgsdorf, 1944	1,800- 2,600				7,031	96,609,848	24.0-29.0
		Meppen-Schwefingen, 1960	4,000				1,042	11,490,388	28.0-30.0
		Ruehlermoor, 1949	2,000- 4,700				10,033	131,416,564	28.0-30.0
		Ruehlertwist, 1949	2,350- 2,900				1,755	29,793,409	25.0
		Scheerhorn, 1949	3,550- 3,750				3,072	48,109,899	30.0
		Other					1,631	29,493,518	
	SCHLESWIG-HOLSTEIN	Ploen-Ost, 1959	6,400		212		34	47,671,250	36.0
		Preetz, 1962	8,350- 8,550				416	10,571,234	29.0
		Reitbrook, 1937	1,450- 2,100				1,726	37,425,867	29.0
		Other					7,033	52,026,904	
	HANOVER	Eldingen, 1949	4,750		845		830	18,585,173	35.0
		Hankensbuettel, 1954	4,450- 5,100				4,573	89,559,879	33.0
		Hardesse, 1958	4,300- 5,900				752	8,951,960	34.0
		Hohne, 1958	4,300- 5,900				884	38,207,015	33.0-34.0
		Knesebeck, 1958	5,100- 5,200				1,314	17,206,219	36.0
		Leiferde, 1956	2,600				635	19,771,030	34.0
		Lueben, 1955	3,950				821	10,968,758	35.0-38.0
		Meckelfeld, 1938	1,000- 1,300				350	13,839,326	24.0-32.0
		Oelheim-Sued, 1968	7,650				693	6,662,992	33.0
		Orrel-Wesendorf-Nord, 1954	4,450				1,362	12,019,840	
		Ruehme, 1954	1,950				797	9,251,239	
		Sinstorf, 1960	6,750- 7,150				764	18,014,124	
		Suderbruch, 1949	3,750- 7,550				674	22,262,262	19.0-38.0
		Vorhop, 1952	2,950- 6,900				1,082	15,724,904	36.0
		Other					3,473	221,495,167	
	UPPER RHINE VALLEY	Landau, 1955	3,950- 4,800		129		1,210	24,078,610	36.0
		Other					1,206	12,276,476	
	WESER-EMS	Barenburg, 1953	2,300- 3,300		725		2,702	34,766,874	29.0
		Bockstedt, 1954	3,750				1,302	19,434,920	
		Bramberge, 1958	2,560- 3,300				5,994	90,054,928	29.0
		Dueste, 1954	2,600- 4,250				1,523	39,956,611	
		Gross Lessen, 1969	3,300				1,100	20,711,641	
		Sued-Oldenburg, 1950	1,700- 6,500				1,473	37,996,405	
		Voigtei, 1953	1,150- 1,500				850	23,615,019	31.0-34.0
		Wehrbleck, 1947	3,400				858	15,153,622	33.0
		Other					1,938	30,513,545	
		Total West Germany			*3,152		81,501	1,464,225,253	
ZAIRE	**GULF OIL**	● GCO, 1970	7,000- 9,000	7			560	5,844,350	29.0
		● Mibale, 1973	5,000- 6,000	7			16,950	67,517,900	30.0
		● Mwambe, 1979	6,150			2	22	445,262	30.4
		● Motoba, 1976	11,098			1	6	122,582	44.3
		Lukami, 1983	12,400	3			7,300	2,437,125	35.0
		Libwa, 1981	5,500			2			
		Total Zaire		17		5	24,938	76,358,219	

*As of Jan. 1, 1985.

Survey of operating refineries worldwide (capacities as of Jan. 1, 1986)

				Charge capacity, b/cd						Production capacity, b/cd					
Country	No. plants	Crude, b/cd	Vacuum distillation	Thermal operations	Catalytic cracking	Catalytic reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alkylation	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Abu Dhabi	3	185,250	43,700	....	....	29,569	24,300	....	95,138	....	....	....	....	....	....
Algeria	4	464,700	15,000	....	....	55,600	....	....	23,600	....	1,900	2,400	5,300	....	....
Angola	1	32,100	1,900	....	....	1,900	....	2,800	3,800	....	....	....	950	....	....
Argentina	11	667,200	191,300	124,800	105,850	38,300	20,700	....	58,100	4,650	....	4,100	17,600	19.0	900
Australia	11	622,610	148,300	....	178,800	157,220	....	26,200	237,500	17,100	5,100	10,700	10,400	....	....
Austria	1	204,000	68,000	17,000	24,000	31,000	....	[illegible],000	49,300	....	9,500	2,300	5,850	....	....
Bahrain	1	250,000	144,000	19,000	36,000	17,100	....	45,000	35,100	1,300	....	....	4,500	26.2	....
Bangladesh	1	31,200	3,530	....	....	1,650	....	2,430	1,940	....	....	....	1,200	....	....
Barbados	1	3,000	....	....	....	....	....	....	....	....	....	....	....	....	....
Belgium	4	652,100	285,300	65,500	100,500	78,200	....	154,400	242,600	7,710	....	....	13,300	46.0	....
Bolivia	3	46,930	2,100	....	....	14,158	....	....	14,613	....	....	500	54	....	....
Brazil	13	1,305,100	685,200	19,900	321,900	21,600	....	....	132,700	7,000	2,400	16,000	41,784	20.1	580
Brunei	1	10,000	....	....	....	....	....	....	....	....	....	....	....	....	....
Burma	2	26,300	4,800	1,700	....	....	....	....	....	....	....	....	....	....	40
Cameroon	1	43,000	....	....	....	6,500	....	10,000	10,000	....	....	....	....	....	....
Canada	28	1,855,800	617,900	74,160	377,000	352,700	123,750	22,750	738,460	71,055	51,170	22,060	99,675	203.3	791
Chile	2	141,000	74,000	8,400	34,000	5,300	....	....	....	1,000	....	....	....	....	....
China, Taiwan	2	542,500	111,700	3,933	22,600	51,960	18,080	85,880	86,900	3,200	16,366	....	10,500	60.0	250
Colombia	4	211,000	120,000	61,000	91,000	6,000	....	....	33,700	10,280	4,860	2,660	2,500	15.8	....
Congo	1	21,000	....	....	....	2,000	2,000	....	3,500	....	....	....	....	....	....
Costa Rica	1	15,200	800	....	....	1,300	....	....	3,500	....	....	....	400	....	....
Cyprus	1	16,000	1,800	....	....	3,400	....	....	6,000	....	....	....	....	....	....
Denmark	3	166,000	22,000	72,800	....	29,100	....	10,000	61,500	....	....	....	8,000	....	....
Dominican Republic	2	44,000	....	....	....	8,300	....	....	20,200	....	....	....	....	0.4	....
Ecuador	3	87,600	28,520	12,600	12,600	2,780	....	....	2,780	....	....	....	1,240	....	....
Egypt	6	434,150	45,100	16,470	....	30,870	....	....	85,082	804	924	3,034	6,633	5.5	540
El Salvador	1	15,300	1,900	....	....	2,800	....	....	12,100	....	....	....	....	....	....
Ethiopia	1	18,000	1,600	....	....	2,200	....	....	4,100	....	....	....	570	....	....
Finland	2	241,000	77,000	46,300	41,800	55,100	14,200	104,500	73,040	3,780	....	....	7,600	20.0	....
France	16	1,946,850	463,250	145,200	258,300	271,100	13,500	277,900	517,400	12,125	14,600	20,100	40,650	28.0	....
Gabon	1	23,000	....	7,200	....	1,400	....	....	5,000	....	....	....	....	....	....
Germany	22	1,932,800	537,300	282,400	183,200	355,500	114,700	332,700	796,950	11,300	35,090	7,900	64,640	156.5	2,020
Ghana	1	28,000	....	....	....	5,550	....	....	....	....	....	....	....	....	....
Greece	4	390,000	61,800	19,520	23,000	31,200	....	15,600	100,500	4,400	....	....	3,000	....	....
Guatemala	1	16,000	....	....	....	3,000	....	....	5,000	....	....	....	....	....	....
Honduras	1	14,000	....	....	....	1,800	....	....	5,000	....	....	....	....	....	....
Hungary	3	241,500	116,500	....	20,000	26,000	....	....	84,900	....	10,400	2,500	9,600	....	....
India	12	866,682	264,070	104,730	104,070	28,490	....	13,800	71,820	....	1,375	11,329	50,728	9.5	675
Indonesia	6	635,800	201,100	81,500	....	60,700	99,900	15,400	91,700	....	....	5,005	11,000	145.1	....
Iran	4	530,000	215,200	80,800	....	63,845	93,180	3,120	34,225	....	....	6,000	12,450	70.0	....
Iraq	8	318,500	82,650	....	....	43,500	38,000	100,000	13,000	....	....	10,168	6,715	64.0	....
Ireland	1	56,000	....	....	....	11,000	....	5,500	11,000	....	....	....	....	....	....
Israel	2	170,000	90,000	62,000	18,000	24,500	....	45,000	28,000	....	....	....	3,000	....	....
Italy	21	2,738,100	699,600	306,630	273,500	311,800	....	415,300	524,600	33,445	56,920	28,300	47,610	44.6	....
Ivory Coast	2	90,000	41,500	....	....	14,600	....	....	42,200	....	....	....	6,000	....	....
Jamaica	1	35,500	2,000	....	....	3,540	....	....	19,600	....	....	....	1,000	....	....
Japan	44	4,613,400	1,558,790	80,520	472,750	543,950	60,250	1,586,050	1,669,990	2,280	40,500	48,150	54,186	815.9	600
Jordan	1	100,000	16,900	....	4,410	8,640	4,230	....	13,860	....	....	....	....	7.9	....
Kenya	1	95,000	....	....	....	9,000	....	....	33,000	....	....	....	....	....	....
Korea	6	782,000	34,400	42,990	....	59,454	7,000	34,500	78,394	....	13,390	5,500	15,200	20.4	....
Kuwait	5	633,600	77,000	....	....	51,000	121,000	333,150	36,000	....	....	....	....	515.9	....
Lebanon	2	17,000	....	....	....	3,100	....	....	3,100	....	....	....	....	....	....

Survey of operating refineries worldwide (capacities as of Jan. 1, 1986)

Country	No. plants	Crude, b/cd	Vacuum distillation	Charge capacity, b/cd						Production capacity, b/cd				Hydrogen (MMcfd)	Coke (t/d)
				Thermal operations	Catalytic cracking	Catalytic reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alkyla-tion	Aromatics-isomerization	Lubes	Asphalt		
Liberia	1	15,000	1,000			2,000			3,300				200		
Libya	3	329,800	3,432			14,182		2,500	35,626				1,716		
Madagascar	1	16,350				2,600			5,500						
Malaysia	4	212,300	4,750			20,900		5,000	53,000						
Martinique	1	12,800				3,000			6,350						
Mexico	9	1,269,000	593,000	82,000	297,000	163,800	18,000	5,000	502,000	6,600	4,624	9,000		70.0	
Morocco	2	81,303	13,160		5,600	13,735			22,442			1,514			
Mozambique	1	17,000	1,500			2,500		2,500					900		
Netherlands	7	1,468,350	141,870	120,010	122,500	148,400		183,200	505,910	4,700		4,000	14,500		
Netherlands Antilles	1	320,000	158,000	67,000	42,000	15,000			121,500	5,600		8,000	8,000		
New Zealand	1	53,000				18,000		6,400	37,000						
Nicaragua	1	14,500				2,800			8,400				2,000		
Nigeria	3	250,400	66,600		44,100	38,100			63,330			4,900	14,100		
Norway	3	240,000	3,000	90,500		29,150		17,500	59,500		3,000		2,000		480
Okinawa	3	110,000				7,400		65,700	36,500					42.7	
Oman	1	48,082				9,644			12,425						
Pakistan	3	130,000	14,200			5,750			27,800		1,250	3,815	4,050	0.1	
Panama	1	100,000	14,000			7,500			30,000				5,000		
Paraguay	1	7,500													
Peru	6	175,560	37,290		21,670	1,680						1,080	1,530		
Philippines	3	216,000	38,100		23,100	33,400		23,500	73,700				5,000		
Portugal	3	295,607	46,756		10,141	35,909	9,362	46,276	47,257		6,950	2,910	4,247		
Puerto Rico	2	121,000	59,300		12,000	5,800	15,000	10,000	15,700	1,000		6,800	900	17.0	
Qatar	1	56,058				10,463		10,850	27,710						
Saudi Arabia	5	1,115,000	138,155	30,000	10,000	87,900	71,100	90,000	112,900		8,000		12,700	181.0	
Senegal	1	29,800	18,800			2,870			2,870						
Sierra Leone	1	10,000													
Singapore	5	1,018,000	147,800	133,000		49,600	34,700	76,700	283,200			7,000	7,700	32.0	
Somalia	1	10,000													
South Africa	5	388,500	177,000	59,500	80,000	62,500	16,500	66,300	131,250	8,800	5,100	3,000	7,040	30.0	
Spain	10	1,367,000	291,800	124,000	87,500	193,100	11,000	156,100	284,000		23,720	9,300	36,750	47.2	3,400
Sri Lanka	1	50,000	1,900	12,500		3,750		2,100	15,300				950		
Sudan	1	23,800				1,700			7,400						
Sweden	6	429,000	111,000	72,444	26,666	74,588		93,777	115,744	3,888		2,600	28,000	0.9	
Switzerland	2	137,000		24,000		25,000		8,000	43,700						
Syria	2	228,790	60,611	41,199		19,348		26,040	37,863				8,036	9.5	685
Tanzania	1	13,500				3,000			5,000						
Thailand	3	191,860	24,450	9,600	9,250	25,300		10,000	93,000				4,100	4.7	
Togo	1	20,000				4,400			7,600						
Trinidad	2	260,000	170,000	18,000	25,000	29,000		102,500	37,800	450	2,800	3,800	1,500		
Tunisia	1	34,000				3,300									
Turkey	4	460,475	124,768		38,600	45,057		4,777	132,109			3,830	17,741	0.4	18
United Kingdom	15	1,791,700	619,840	166,000	363,500	368,500	29,000	131,600	766,590	47,550	34,665	17,100	24,450	77.4	1,900
Uruguay	1	45,000	12,000		5,000	3,000			8,000				3,000		
Venezuela	7	1,229,700	551,500	122,000	179,400	6,000		297,700	10,000	61,050	18,400	6,900	47,900	109.0	100
Virgin Islands	1	600,000	190,000	40,000		125,000		130,000	290,000		45,000				
Yemen, S	1	161,500	9,500			10,800									
Yugoslavia	7	301,607	38,239	6,100	1,960	45,156	7,456	14,493	28,560		9,600	3,100	11,610	14.0	240
Zaire	1	17,000				3,000			5,000						
Zambia	1	25,000	2,400			5,600			9,000				960		
Total	428	40,144,614	11,043,231	2,974,906	4,108,267	4,728,458	966,908	5,298,493	10,344,328	331,067	427,604	307,355	840,415	2,930.0	13,219

Worldwide refining

AILLEEN CANTRELL
Director of Editorial Surveys

All figures in barrels per calendar day

All figures are
as of 1-1-86

LEGEND

Numbers identify processes in table

Thermal processes
1. Gas oil cracking
2. Thermal cracking
3. Visbreaking
4. Fluid coking
5. Delayed coking
6. Other

Catalytic cracking
1. Fluid
2. Other

Catalytic reforming
Semiregenerative
- 1. Conventional catalyst
- 2. Bimetallic catalyst

Cyclic:
- 3. Conventional catalyst
- 4. Bimetallic catalyst

Other:
- 5. Conventional catalyst
- 6. Bimetallic catalyst

Catalytic hydrocracking
1. Distillate upgrading
2. Residual upgrading
3. Lube-oil manufacturing
4. Other

Catalytic hydrorefining
1. Residual desulfurization
2. Heavy gas oil desulfurization
3. Cat cracker and cycle stock feed pretreatment
4. Mid distillate
5. Other

Catalytic hydrotreating
1. Pretreating cat reformer feeds
2. Naphtha desulfurizing
3. Naphtha olefin or aromatics saturation
4. Straight-run distillate
5. Other distillates
6. Lube oil "polishing"
7. Other

Alkylation
1. Sulfuric acid
2. Hydrofluoric acid

Aromatics Isomerization
1. BTX
2. Hydrodealkylation
3. Cyclohexane
4. C_4 feed
5. C_5 feed
6. C_5 and C_6 feed

Hydrogen
1. Steam methane reforming
2. Steam naphtha reforming
3. Partial oxidation
4. Cryogenic
5. Other

Calendar-day figures reported in this survey are the average volume a refinery unit processes each day including downtime used for turnarounds. This is actual total volume for the year divided by 365. (Stream day figures represent the amount a unit can process when running full capacity for short periods.)

INACTIVE REFINERIES

Australia
1. BP Australia, Westernport, 57,000 b cd.

Bahamas
2. Bahamas Oil Refining Co., Freeport, 350,000 b cd.

Belgium
3. Belgische Petroleum Raffinaderij NV, Antwerp, 75,400 b cd.

France
4. Shell Francaise, Pauillac, 92,000 b cd.

Germany
5. Deutsche BP AG, Finkenwerder, Hamburg (imported feedstock).
6. Erdolraffinerie Ingolstadt AG, Donau, 60,000 b cd. (Inactive crude unit only—see Deutsche BP, Vohburg).
7. Mobil Oil AG, Wilhelmshaven, 160,000 b cd.
8. Saarland Raffinerie GmbH, Volklingen, 78,000 b cd.

Guam
9. Guam Oil & Refining Co., Apra Heights, 43,700 b cd.

Italy
10. Aquila SpA, Trieste, 110,000 b cd.
11. Sarom, Ravenna, 200,000 b cd.

Japan
12. General Sekiyu Seisei KK, Kawasaki, 40,500 b cd.

Netherlands Antilles
13. Lago Oil & Transport CL, Aruba, 420,000 b cd.

United Kingdom
14. Shell U.K. Ltd., Teesport, 104,000 b cd.

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd					Coke, tons/day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt	Hydrogen, MMcfd	
ABU DHABI	Abu Dhabi National Oil Co.–Ruwais	114,000	43,700			^{2}17,235	^{1}24,300		^{2}30,915 ^{7}18,702 ^{7}19,665						
	Umm Al-Nar 1	14,250				^{4}2,520			^{2}4,770						
	Umm Al-Nar 2	57,000				^{2}9,814			^{2}15,777 ^{7}5,309						
	Total	**185,250**	**43,700**	....	....	**29,569**	**24,300**	....	**95,138**	....	....	....	....	....	....
ALBANIA	Government-owned refineries at Ballsh, Cerrik, Stalin														
	Total	**40,000**													
ALGERIA	Sonatrach: Arzew	60,000	6,000			8,600			8,600			2,400	2,400		
	Hassi Messaoud	23,700				2,000									
	Maison Carree	58,000				15,000			15,000						
	Skikda	323,000	9,000			30,000					1,900		2,900		
	Total	**464,700**	**15,000**	....	....	**55,600**	....	....	**23,600**	....	**1,900**	**2,400**	**5,300**	....	....
ANGOLA	Petrangol SARL–Luanda	**32,100**	**1,900**	....	....	^{1}**1,900**	....	^{4}**2,800**	^{1,2}**3,800**	....	....	....	**950**	....	....
ARGENTINA	Destileria Argentina de Petróleo SA– Lomas de Zamora	2,000	1,500												
	Esso SAPA–Campana	94,400	49,800	^{5}18,900	^{1}24,850	^{1}8,300			^{1}8,300			1,000			900
	Galvan	17,800		^{2}6,900											
	Isaura SA–Bahia Blanca	12,000													
	Shell Cia. Argentina de Petróleo SA– Buenos Aires	102,000		^{2}27,000	20,000	9,500			25,000						
	Yacimientos Petroliferos Fiscales– Campo Duran	32,000													
	Dock Sud	4,000	1,000												
	La Plata	216,000	69,500	^{5}22,000	^{1}45,000	^{1}9,000			^{1}9,000 ^{4}3,000 ^{6}5,900	^{1}1,200 ^{2}750 *2,700		3,100	17,600		
	Lujan de Cuyo	129,000	66,000	^{5}30,000	^{1}16,000	^{1}9,000	^{1}20,700		^{1}4,400					^{1}19.0	
	Plaza Huincul	23,000				^{2}2,500			^{2}2,500						
	San Lorenzo	35,000	3,500	^{2}7,500 ^{3}12,500											
	Total	**667,200**	**191,300**	**124,800**	**105,850**	**38,300**	**20,700**	....	**58,100**	**4,650**	....	**4,100**	**17,600**	**19.0**	**900**
AUSTRALIA	Ampol Refineries Ltd.–Lytton^{1}	65,000	25,000		^{1}26,000	^{1}12,600				^{2}4,000 *1,000	^{6}5,100				
	Australian Oil Refinery PL–Kurnell^{2}	100,000	20,000		^{1}39,000	^{1}25,600			^{1}25,600 ^{4,5}14,000	^{1}2,600 *2,700			3,000		
	Australian Lubricating Oil Refinery Ltd.–Kurnell		6,900						^{6}6,300			3,400			
	BP Australia–Brisbane	42,000	11,400		^{1}12,800	^{2}8,500			^{4}7,600	^{2}1,700			1,500		
	Kwinana	100,000	43,000		^{1}24,000	^{1}6,400 ^{2}16,400		^{4}8,200	^{1}12,000	^{2}2,400		2,600	1,700		
	Maranoa Oil & Refining Co.– Roma, Queensland	510				^{1}220									
	Mobil Oil Australia Ltd.–Adelaide		20,000									4,700			

	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd				Hydrogen, MMcfd	Coke, tons/day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt		
	Petroleum Refineries Australia PL–														
	Adelaide	46,500				[2]16,000			[7]35,000				1,200		
	Altona	98,600	22,000		[2]24,000	[2]28,000			[1]35,000 [4]10,000	[1]2,700			3,000		
	Shell Refining (Australia) PL –Clyde	64,000			28,000	12,500		7,000	37,000	....					
	Geelong	106,000			[1]25,000	31,000		11,000	55,000	....					
	Total	**622,610**	**148,300**	....	**178,800**	**157,220**	....	**26,200**	**237,500**	**17,100**	**5,100**	**10,700**	**10,400**	....	....

Solvent extraction [1]5,300 b/cd [2]4,800 b/cd

	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd				Hydrogen, MMcfd	Coke, tons/day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt		
AUSTRIA	OeMV–Schwechat	204,000	68,000	[3]17,000	[1]24,000	[2]14,000 [4]17,000		[2]35,000 [4]33,000	[1]37,000 [6]1,300 [7]11,000	....	[6]9,500	2,300	5,850		
	Total	**204,000**	**68,000**	**17,000**	**24,000**	**31,000**	....	**68,000**	**49,300**	....	**9,500**	**2,300**	**5,850**	....	...
BAHRAIN	Bahrain Petroleum Co BSC (Closed) –Sitra	250,000	144,000	[3]19,000	[1]36,000	[4]17,100		[2]45,000	[1]17,100 [4]18,000	*1,300			4,500	[1]26 2	
	Total	**250,000**	**144,000**	**19,000**	**36,000**	**17,100**	....	**45,000**	**35,100**	**1,300**			**4,500**	**26.2**	....
BANGLADESH	Eastern Refinery Ltd –Chittagong	**31,200**	**3,530**	....	....	**[1]1,650**	....	**[3]2,430**	**[1]1,940**	....	....	....	**1,200**	....	....
BARBADOS	Mobil Oil Barbados Ltd –Bridgetown	**3,000**	....	....	....	....	....	....	....	....	....	....	....	....	....
BELGIUM	Belgian Refining Corp NV–Antwerp	108,500	45,000	[3]23,000		[2]12,000		[5]12,000	[1,2]22,500 [5]25,000						
	Belgian Shell NV–Ghent	8,600													
	Esso Belgium–Antwerp	229,000	108,000		[1]25,000	[4]36,000		[2]79,000	[2]52,000 [4]41,000 [5]35,000				2,000	[1]46 0	
	SIBP NV–Antwerp	306,000	132,300	[3]42,500	[1]75,500	[2]30,200		[4]63,400	[1,2]67,100	[2]6,150 *1,560			11,300		
	Total	**652,100**	**285,300**	**65,500**	**100,500**	**78,200**	....	**154,400**	**242,600**	**7,710**	....	....	**13,300**	**46.0**	....
BOLIVIA	Yacimientos Petroliferos														
	Fiscales Bolivianos–Cochabamba[1]	27,500	2,100			[1]7,758			[1]7,758 [6]455			500	54		
	Santa Cruz	16,430	....			[1]6,400			[1]6,400						
	Sucre	3,000	....												
	Total	**46,930**	**2,100**	....	....	**14,158**	....	....	**14,613**	....	....	**500**	**54**	....	....

[1]Solvent extraction 166 b/cd

	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd				Hydrogen, MMcfd	Coke, tons/day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt		
BRAZIL	Petróleo Brasileiro SA Araucaria,														
	Paraná[1]	144,800	69,400		[1]45,500								7,600		
	Betim, Minas Gerais	120,600	58,300		[1]30,400				[2]10,200 [5]25,000				1,000	[2]5 0	
	Canoas, Rio Grande do Sul	63,300	35,000		[1]13,600								1,100		
	Cubatão, São Paulo	127,300	77,800	[5]16,200 [6]3,700	[1]48,300	[1]10,200				[3]3,700	[1]2,400		5,900		580

WORLDWIDE REFINING		Company and refinery location	Crude	Charge capacity, b/cd Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Production capacity, b/cd Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons/ day
		Duque de Caxias, Rio de Janeiro^{2}	221,300	110,000		^{1}46,300	^{1}11,400			^{5}12,900 ^{7}800			12,500	4,300	^{7}5.0	
		Fortaleza, Ceará	4,200	4,200										2,500		
		Manaus, Amazonas	8,400	4,300		^{1}1,800								400		
		Mataripe, Bahia^{3}	122,400	58,800		^{1}25,000				^{6}3,400 ^{7}2,500			3,500	1,700	^{1}1.1	
		Mauá, Santo André, São Paulo	27,200	7,700		^{2}14,400					*3,300					
		Paulinia, São Paulo	289,500	177,300		^{1}39,800								4,800		
		São José dos Campos, São Paulo	156,800	78,300		^{1}54,300				^{2}18,200 ^{4}59,700				7,500	^{7}9.0	
		Refinaria de Petróleo Ipiranga SA–Rio Grande do Sul	9,300	4,100		^{1}2,500								4,984		
		Refinaria de Petroleos de Manguinhos SA–Rio de Janeiro	10,000		†^{2}1,020 †^{3}467.5											
		Total	**1,305,100**	**685,200**	**19,900**	**321,900**	**21,600**	....	....	**132,700**	**7,000**	**2,400**	**16,000**	**41,784**	**20.1**	**580**
		Solvent extraction: ^{1}23,400 b/d; ^{2}30,200 b/d (13,100 b/d for lubes); ^{3}3,400 (for lubes). †Figures in BPH. Not included in totals.														
BRUNEI		Brunei Shell Petroleum CL–Seria	**10,000**	....	....	....	....	....	....	....	....	....	....	....	....	....
BULGARIA		Government-owned refineries at Burgas, Pleven, Ruse														
		Total	**300,000**													
BURMA		Petrochemical Industries Corp.–Chauk	6,300	2,500												
		Syriam	20,000	2,300	^{7}1,700											40
		Total	**26,300**	**4,800**	**1,700**	....	....	....	....	....	....	....	....	....	....	**40**
CAMEROON		Sonara–National Refining CL–Cape Limboh, Limbe	**43,000**	....	....	....	^{1}**6,500**	....	^{4}**10,000**	^{1}**10,000**	....	....	....	....	....	....
CANADA	**Alberta**	Gulf Canada Products Co.–Edmonton	121,000	27,000	^{5}7,100		^{2}12,600			^{4}21,900 ^{5}5,400 ^{7}46,600	^{2}10,100	^{4}2,900			^{1}30.8	431
		Husky Oil Operations Ltd.–Lloydminster	23,500	15,000										12,000		
		Imperial Oil Ltd.–Edmonton	163,700	61,800		^{1}47,000	^{4}20,900			^{2}43,700	^{2}12,700	^{4}5,800	2,900	10,000		
		Shell Canada Ltd.–Bowden	5,000				^{5}2,250			^{1}2,430						
		Scotford	50,000				^{5}18,450	^{4}31,500	^{4}17,550	^{1}18,450		^{1}9,900 ^{2}5,400 ^{3}270				
		Turbo Resources Ltd.–Balzac	27,500	6,950		^{1}8,800	^{2}7,550			^{2}7,550 ^{4}7,350 ^{1}15,300	*2,300					
		Total	**390,700**	**110,750**	**7,100**	**55,800**	**61,750**	**31,500**	**17,550**	**168,680**	**25,100**	**24,270**	**2,900**	**22,000**	**30.8**	**431**
	British Columbia	Chevron Canada Ltd.–North Burnaby	35,000	11,200		^{1}13,000	^{2}11,700			^{1}12,000	*650			2,200		
		Gulf Canada Products Co.–Port Moody	37,200	11,200		^{1}12,300	^{2}8,600			^{1}15,400 ^{4}13,200	^{1}1,400					
		Husky Oil Operations Ltd.–Prince George	9,500	3,800		^{1}3,300	^{4}1,400			^{1}6,900				1,300		

	Company and refinery location	Crude	Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. •Poly.	Aromatics isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons day
					Charge capacity, b/cd					Production capacity, b/cd					
	Imperial Oil Ltd –Ioco	40,900	20,900		^{1}12,400	^{1}6,700			^{2}6,600 ^{4}5,700 ^{5}5,700	•1,200					
	Petro-Canada Products Inc –Taylor	19,000	1,150		^{1}6,250	^{2}2,950			^{2}4,000 ^{4}7,000	^{2}1,000			525		
	Shell Canada Ltd –Shellburn, Burnaby^{1}	24,000	6,650		^{1}5,400	^{6}2,430			^{2}5,400 ^{5}9,900				2,250		
	Total	**165,600**	**54,900**	....	**52,650**	**33,780**	....	....	**91,800**	**4,250**	....	....	**6,275**	....	....
	^{1}Solvent extraction 720 b/cd														
New Brunswick	Irving Oil Ltd –St. John	237,500	61,750	^{3}18,000	^{1}17,100	^{2}34,650	^{1}29,700		^{1}45,450 ^{4}40,500	•1,710			11,700	^{2}40.0	
	Total	**237,500**	**61,750**	**18,000**	**17,100**	**34,650**	**29,700**	....	**85,950**	**1,710**	....	....	**11,700**	**40.0**	....
Northwest Territories	Imperial Oil Ltd –Norman Wells	**2,900**								....	....	....	....	....	....
Nova Scotia	Imperial Oil Ltd –Dartmouth	82,300	39,800		^{1}22,600	^{4}8,500			^{1}8,600 ^{4}25,700 ^{5}8,600	•2,600				^{1}1.7	
	Texaco Canada Ltd –Halifax	20,000	8,600		^{1}7,200	^{2}3,600		^{4}5,200	^{1}3,600						
	Total	**102,300**	**48,400**	....	**29,800**	**12,100**	....	**5,200**	**46,500**	**2,600**	....	....	....	**1.7**	....
Ontario	Gulf Canada Products Co –Clarkson^{1}	60,000	20,400			^{6}8,800			^{1}10,500 ^{4}8,000 ^{6}10,300	•700		4,600	1,500	^{1}13.3	
	Imperial Oil Ltd –Sarnia	123,500	28,500	^{4}12,600	^{1}23,000	^{2}15,500 ^{4}13,300	^{1}8,900		^{2}32,300 ^{4}13,300 ^{5}14,400	^{2}6,800 •3,000		6,000		^{1}18.5	
	Petro-Canada Products Inc –Oakville	80,000	41,000		^{2}23,000	^{1}5,000 11,500			^{1}19,500 ^{7}5,700	^{1}4,200			10,000		
	Shell Canada Ltd –Sarnia	71,000	24,700	^{3}3,060	^{1}14,400	^{6}20,970	^{1}6,750		^{1}15,030 ^{5}6,300						
	Sunoco Inc –Sarnia	90,000	16,000	^{3}6,000	^{2}17,000	^{1}5,500 ^{2}22,500	^{1}20,000		^{1}32,500 ^{4}4,000	^{2}4,000	^{1}8,000			^{1}41.0	
	Texaco Canada Ltd –Nanticoke	95,000	31,000		^{1}40,000	^{2}24,000			^{1}24,000	^{1}7,400					
	Total	**519,500**	**161,600**	**21,660**	**117,400**	**127,070**	**35,650**	....	**195,830**	**26,100**	**8,000**	**10,600**	**11,500**	**72.8**	....
	^{1}Solvent extraction 4,600 b/cd														
Quebec	Gulf Canada Products Co –Montreal^{1}	74,000	29,800		^{1}22,100	^{2}8,600			^{1}12,500 ^{4}13,400	•900	^{1}3,400 ^{2}1,300 ^{3}2,800		1,500	^{1}13.0	
	Petro-Canada Products Inc –Montreal	90,000	43,000	^{1}13,000	^{2}18,000	^{2}30,500	^{4}15,200		^{2}25,650 ^{4}14,250	^{1}1,425 •480	^{1}8,700 ^{2}2,700		10,000	^{1}45.0	
	Shell Canada Ltd –Montreal	120,000	49,400	^{3}8,100	^{1}21,150	^{6}20,700	^{1}11,700		^{2}27,900 ^{4}32,400	^{2}1,440		3,060	7,200		

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd: Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Production capacity, b/cd: Alky. *Poly.	Aromatics/isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons/day
	Ultramar Canada Inc.–St. Romuald	100,000	33,000		[1]30,000	[2]14,600			[1]14,600	*2,650			29,500		
	Total	**384,000**	**155,200**	**21,100**	**91,250**	**74,400**	**26,900**	....	**140,700**	**6,895**	**18,900**	**3,060**	**48,200**	**58.0**	....
	[1]Solvent extraction 4,400 b/cd														
Saskatchewan	Consumer's Cooperative Refineries Ltd.–Regina	40,000	18,000	[1]6,300	[1]13,000	[1]9,000			[1]9,000	*4,400					360
	Gulf Canada Products Co.–Moose Jaw	13,300	7,300									5,500			
	Total	**53,300**	**25,300**	**6,300**	**13,000**	**9,000**	....	....	**9,000**	**4,400**	....	**5,500**	....	....	**360**
	Total Canada	**1,855,800**	**617,900**	**74,160**	**377,000**	**352,700**	**123,750**	**22,750**	**738,460**	**71,055**	**51,170**	**22,060**	**99,675**	**203.3**	**791**
CHILE	Petrox SA–Concepcion	72,000	40,000	[1]8,400	[1]20,000										
	Refineria de Concon–Concon	69,000	34,000		[1]14,000	[1]5,300				[1]1,000					
	Total	**141,000**	**74,000**	**8,400**	**34,000**	**5,300**	....	....	....	**1,000**	....	....	....	....	....
CHINA	Government-owned refineries at Anshan, Beijing, Dalian, Daqing, Fushun, Hangzhou, Jinxi, Karamai-Dushanzi, Lanchow, Lenghu, Maoming, Nanchong, Nanjing, Shanghai, Shengli, Tianjin, Yumen														
	Total	**2,050,000**													
CHINA, TAIWAN	Chinese Petroleum Corp.–Kaohsiung	425,000	79,100	[1]3,933	[1]22,600	[1]18,080 [3]18,080	[1]18,080	[2]31,640 [3]22,600 [4]13,560	[1]36,200 [2]3,200 [4]17,200	[2]3,200	[1]14,070 [2]1,148 [3]1,148		10,500	[1]50.0	250
	Tao-Yuan	117,500	32,600			[1]15,800		[2]18,080	[1]15,800 [4]14,500					[1]10.0	
	Total	**542,500**	**111,700**	**3,933**	**22,600**	**51,960**	**18,080**	**85,880**	**86,900**	**3,200**	**16,366**	....	**10,500**	**60.0**	**250**
COLOMBIA	Empresa Colombiana de Petroleos–Barrancabermeja-Santander[1]	135,000	80,000	[1]41,000	[1]62,000	[2]6,000			[1]22,000 [3]6,000 [6]4,300 [7]1,400	[1]3,000 [2]330 *1,150	[1]3,300 [2]1,100 [3]460	2,660	2,500	[1]15.8	
	Cartagena, Bolivar	70,000	40,000	[1]20,000	[1]29,000					*5,800					
	Orito, Putumayo	1,000													
	Tibu, N. de Santander	5,000													
	Total	**211,000**	**120,000**	**61,000**	**91,000**	**6,000**	....	....	**33,700**	**10,280**	**4,860**	**2,660**	**2,500**	**15.8**	....
	[1]Solvent extraction 35,000 b/cd														
CONGO	Coraf–Pointe-Noire	**21,000**	....	....	....	[1]**2,000**	[1]**2,000**	....	[4]**3,500**	....	....	....	....	....	....
COSTA RICA	Refinadora Costarricense de Petroleo SA–Limon	15,200	800			[1]1,300			[1]1,300 [4]2,200				400		
	Total	**15,200**	**800**	....	....	**1,300**	....	...	**3,500**	....	....	....	**400**	....	....
CUBA	Government-owned refineries at Cabaiguan, Havana, Santiago de Cuba														
	Total	**160,000**													

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd				Hydrogen, MMcfd	Coke, tons/day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt		
CYPRUS	Cyprus Petroleum Refinery Ltd – Larnaca	**16,000**	**1,800**	....	....	**[4]3,400**	....	....	**[4]6,000**	....	....	....	....	....	....
CZECHO-SLOVAKIA	Government owned refineries at Bratislava, Kolin, Kralupi, Pardubice, Strazke, Zaluzi, Zyolen														
	Total	**455,000**													
DENMARK	AS Dansk Shell–Fredericia	49,000		[2]23,000		11,000		10,000	15,000						
	Dansk Esso AS–Kalundborg	65,000	22,000	[3]28,000		[2]7,800			[2]7,800 [4]11,800				8,000		
	Kuwait Petroleum Refining (Danmark) A/S–Skaelskor	52,000		[2]3,200 [3]18,600		[2]10,300			[3]13,800 [4]6,200 [5]6,900						
	Total	**166,000**	**22,000**	**72,800**	....	**29,100**	....	**10,000**	**61,500**	....	....	....	**8,000**	....	....
DOMINICAN REPUBLIC	Falconbridge Dominicana C por A–La Peguera	16,000							[2]6,200					[2]0.4	
	Refineria Dominicana de Petroleo SA–Haina	28,000				8,300			14,000						
	Total	**44,000**	....	....	....	**8,300**	....	....	**20,200**	....	....	....	....	**0.4**	....
ECUADOR	CEPE–Esmeraldas	55,600	28,520	[1]12,600	[1]12,600	[2]2,780			[1]2,780				1,240		
	Anglo Ecuadorian Oilfields Ltd – Sta. Elena Peninsula	31,000													
	Texaco–Lago-Agrio	1,000													
	Total	**87,600**	**28,520**	**12,600**	**12,600**	**2,780**	....	....	**2,780**	....	....	....	**1,240**	....	....
EGYPT	Alexandria Petroleum Co.–Alexandria (El-Mex)	111,150	21,375						[6]1,728		482	924	2,010	[1]1.0	
	Cairo Oil Refining Co.–Mostorod	128,250				[2]9,000			[1]11,700 [4]14,400						
	Tanta	24,700													
	El Ameria Oil Refining Co.–Alexandria	71,250	14,725			[2]9,000			[1]12,150 [4]14,400 [6]1,608	[2]804	[1]442	1,407	2,010	[1]1.0	
	El-Nasr Petroleum Co.—El-Suez	76,000											2,613		
	Suez Oil Processing Co.–El-Suez	22,800	9,000	[5]16,470		[2]12,870			[1]17,100 [4]10,800 [6]1,196			703		[5]3.5	540
	Total	**434,150**	**45,100**	**16,470**	....	**30,870**	....	....	**85,082**	**804**	**924**	**3,034**	**6,633**	**5.5**	**540**
El SALVADOR	Refineria Petrolera Acajutla SA–Acajutla	16,300	1,900			[1]2,800			[2]5,600 [4]6,500						
	Total	**16,300**	**1,900**	....	....	**2,800**	....	....	**12,100**	....	....	....	....	....	....
ETHIOPIA	Ethiopian Petroleum Corp.–Assab	**18,000**	**1,600**	....	....	**[1]2,200**	....	....	**[1]4,100**	....	....	....	**570**	....	....

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd					
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons/day
FINLAND	Neste Oy–Naantali	44,000	13,700	^{3}7,100	^{2}13,300	^{5}6,800		^{4}21,800	^{2}6,600 ^{7}240	*280			3,000		
	Porvoo	197,000	63,300	^{3}39,200	^{1}28,500	^{1}19,800 ^{2}28,500	^{1}14,200	^{4}82,700	^{2}66,200	*3,500			4,600	^{1}20.0	
	Total	**241,000**	**77,000**	**46,300**	**41,800**	**55,100**	**14,200**	**104,500**	**73,040**	**3,780**	....	....	**7,600**	**20.0**	....
FRANCE	Cie Francaise de Raffinage–Gonfreville L'Orcher^{1}	309,000	73,000	^{3}18,400	^{1}30,100	^{2}45,400		^{2}60,400 ^{5}19,000	^{2}71,600	*925	^{1}1,500	7,400	20,250		
	La Mede	136,000	47,500	^{3}25,000	^{1}30,000	^{2}23,400		^{2}50,000 ^{5}15,000		^{2}2,400			16,200		
	Mardyck	122,000	40,000		^{1}21,000	^{2}20,500		^{2}26,200	^{2}37,500						
	Cie Rhenane de Raffinage–Reichstett-Vendenheim	86,000		^{2}16,000	^{1}11,000	12,000		12,000	19,000						
	Elf France–Ambes				^{1}7,000										
	Donges	214,000	91,000		^{1}34,000	^{4}30,000			^{4}49,700	^{2}5,000	^{6}3,800				
	Feyzin	186,000	37,000	^{3}16,000	^{1}18,000	^{4}9,800			^{4,5}31,600		^{1}5,000				
	Grandpuits	100,000	51,000	^{3}15,000	^{1}25,000	^{4}15,000			^{4}31,000	^{2}3,800					
	Esso SAF–Fos sur Mer	68,000	13,000			^{2}10,000			^{1,2}18,000 ^{4,5}19,000						
	Port Jerome	57,950	25,650		^{1}7,200	^{2}6,300			^{1,2}14,000 ^{4}21,000			3,000			
	Mobil Oil Francaise–Frontignon	82,000	30,600		^{2}17,000	^{2}20,000			^{1}26,000 ^{5}27,000						
	Notre Dame de Gravenchon	57,000	36,500			^{2}17,000			^{1}21,000 ^{4}23,000			5,500	1,500		
	Shell Francaise–Berre l'Etang	130,000		^{2}22,000	19,000	15,000		32,000	32,000						
	Petit Couronne	217,000		10,000	^{1}19,000	41,000		31,000	62,000						
	Ste. Francaise des Petroles BP–Dunkirk		18,000									4,200			
	Lavera	181,900		^{3}22,800	^{1}20,000	^{1}5,700	^{1}13,500	^{4}32,300	^{5}14,000		^{1}4,300		2,700	^{1}28.0	
	Total	**1,946,850**	**463,250**	**145,200**	**258,300**	**271,100**	**13,500**	**277,900**	**517,400**	**12,125**	**14,600**	**20,100**	**40,650**	**28.0**	....

---

[1] Solvent extraction: 9,800 b/cd

WORLDWIDE REFINING	Company and refinery location	Crude	Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons/day
GABON	Ste. Gabonaise de Raffinage–Port Gentil	**23,000**	....	**^{3}7,200**	....	**^{3}1,400**	....	....	**^{4}5,000**	....	....	....	....	....	....
GERMANY, E.	Government-owned	**470,000**													
GERMANY, WEST	Deutsche BP-Erdol Ingolstadt–Vohburg†	102,000	35,300		^{1}17,200	^{2}16,700		^{4}14,000	^{4}28,000				5,500		
	Deutsche Marathon Petroleum GmbH–Burghausen	70,000		^{5}26,000					^{5}18,000		^{1}2,200				680
	Deutsche Shell AG–Godorf	170,000		^{2}35,000		38,000	19,000	40,000	81,000						
	Harburg-Grasbrook	86,000		^{2}14,000	^{1}12,000	15,000		12,000	30,000						
	Monheim	8,000													
	Deutsche Texaco AG–Heide	80,000	34,000		^{2}9,000	^{6}18,000		^{4}29,000	^{1}26,000	*300			3,500		
	Elf Bitumenwerke GmbH–Brunsbuettel		7,500												
	Erdol Raffinerie Duisburg GmbH–Duisburg	37,800	11,300			^{2}7,300		^{4}4,200	^{1,2}7,300						
	Erdoel Raffinerie Neustadt GmbH–Neustadt-Donau	144,000	65,400	^{3}15,300	^{1}22,700	^{1}17,700		^{4}27,200	^{1}22,500				5,400		

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd				Hydrogen, MMcfd	Coke, tons/day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics isomerization	Lubes	Asphalt		
	Esso AG–Hamburg	90,000	18,000		^{1}15,500	^{2}12,800			^{2}27,800 ^{5}33,500				6,900		
	Ingolstadt	95,000	31,400		^{1}19,800	^{2}12,800			^{2}19,700 ^{4}47,400				7,400		
	Karlsruhe	150,000	46,700	^{2}28,000 ^{3}23,000 ^{5}13,900 ^{6}1,900		^{2}27,900			^{2}43,000 ^{5}73,000				10,000		300
	Gewerkschaft Erdol-Raffinerie Deurag-Nerag–Misburg	45,000		^{5}13,000		7,000		6,000	10,000						
	Mobil Oil AG–Wilhelmshaven	160,000				^{2}32,000	^{1}10,000 ^{4}8,500		^{1}41,000 ^{4}55,000						
	Worth	75,000	23,000		^{1}15,000	^{2}14,000			^{1}28,000 ^{5}19,000				5,000		
	Oberrheinische Mineralolwerke GmbH–Karlsruhe	142,000	102,000	^{3}26,000	^{1}66,000	^{2}11,400 ^{6}20,100		^{3}45,900 ^{4}24,600	^{1}37,400	^{2}8,500			11,800		
	Oelwerke Julius Schindler GmbH–Hamburg		10,000						^{6}5,200			5,000			
	Ruhr Oel GmbH–Gelsenkirchen	215,400	48,200	^{3}16,000 ^{5}28,000	^{1}6,000	^{1}11,900 ^{5}27,000	^{1}30,000	^{4}63,000	^{1}53,000		^{1}10,620 ^{2}2,150 ^{3}2,420		4,840	^{5}25.0	620
	Union Rheinische Braunkohlen Kraftstoff AG–Wesseling	95,000	71,000	^{3}27,000		^{4}14,000	^{1}28,000	^{4}16,000	^{1}14,000 ^{2}16,000 ^{3}15,000	*2,500	^{1}6,000			^{1}32.0 ^{3}42.0 ^{4}17.0	
	Wintershall AG–Lingen	91,400	28,900	^{5}15,300		^{1}7,400 ^{2}11,100 ^{4}15,000	^{1}19,200	^{4}21,300	^{1}18,400 ^{2}2,500		^{1}500 ^{2}900 ^{3}2,200		3,400	^{1}40.0	420
	Mannheim	71,100				^{2}18,400		^{4}29,500	^{1}18,400 ^{3}5,500		^{1}2,650 ^{2}2,650 ^{5}2,800				
	Salzbergen	5,100	4,600						^{6}1,350			2,900	900	^{1}0.5	
	Total	**1,932,800**	**537,300**	**282,400**	**183,200**	**355,500**	**114,700**	**332,700**	**796,950**	**11,300**	**35,090**	**7,900**	**64,640**	**156.5**	**2,020**

†Operating on a semi-integrated basis

WORLDWIDE REFINING	Company and refinery location	Crude	Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons/day
GHANA	Ghanaian Italian Petroleum CL–Tema	**28,000**	....	....	....	**^{1}5,550**	....	....	....	....	....	....	....	....	....
GREECE	Hellenic Aspropyrgos Refinery SA–Aspropyrgos	110,000	4,300			^{2}5,200 ^{2}9,500		^{2}15,600	^{2}22,300						
	Motor Oil (Hellas) Corinth Refineries SA–Aghii Theodori	100,000	50,000	^{3}19,520	^{1}23,000	^{1}8,500			^{1}11,800 ^{5}25,800 ^{6}3,100	^{2}2,400 *2,000					
	Petrola Hellas SA–Elefsis	108,000													
	Thessaloniki Refining Co AE–Thessaloniki	72,000	7,500			^{1}8,000			^{2}15,800 ^{4}21,700				3,000		
	Total	**390,000**	**61,800**	**19,520**	**23,000**	**31,200**	....	**15,600**	**100,500**	**4,400**	....	....	**3,000**	....	....

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd				Hydrogen, MMcfd	Coke, tons day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics isomerization	Lubes	Asphalt		
GUATEMALA	Texas Petroleum Co –Escuintla	16,000				[2]3,000			[1]3,000 [4]2,000						
	Total	**16,000**	....	....	....	**3,000**	....	....	**5,000**	....	....	....	....	....	....
HONDURAS	Refineria Texas de Honduras SA–Puerto Cortes	14,000				[1]1,800			[1]3,000 [4]2,000						
	Total	**14,000**	....	....	....	**1,800**	....	....	**5,000**	....	....	....	....	....	....
HUNGARY	Dunai KV–Szazhalombatta	165,000	77,500		20,000	[4]26,000			[1]26,000 [4]40,000 [6]2,500		[1]6,200 [6]4,200	2,500	4,700		
	Tiszai KV–Leninvaros	66,500	33,000						[4]16,400						
	Zalai KV–Zalaegerszeg	10,000	6,000						....				4,900		
	Total	**241,500**	**116,500**	....	**20,000**	**26,000**	....	....	**84,900**	....	**10,400**	**2,500**	**9,600**	....	....
INDIA	Bharat Petroleum CL–Mahul, Bombay	105,432	33,000		[1]17,000	7,000							10,000		
	Bongaigaon Refinery & Petrochemicals Ltd –Bongaigaon, Assam	21,400		[5]10,400		[1]1,930			[1]1,930						185
	Cochin Refineries Ltd –Kerala	90,000	34,270	[3]22,830	[1]19,100	[5]5,660			[2]11,690 [5]22,900				6,020		
	Hindustan Petroleum CL–														
	Mahul, Bombay	90,000	35,000		[1]9,000							6,329	10,995		
	Visakhapatnam	30,000			[1]7,600								3,000		
	Indian Oil CL–Barauni	66,000	15,000	[5]11,000											300
	Digboi	10,050		[3]800								1,200	513		40
	Gauhati	16,400		[5]5,500											150
	Gujarat	147,700	47,000	[3]18,900	[1]19,800	[1]7,000					[1]1,375		4,300		
	Haldia	55,000	20,000	[3]8,500		[1]4,500		[4]13,800	[6]3,800			3,800	3,500		
	Mathura	120,000	43,000	[3]18,900	[1]19,800								8,600		
	Madras Refineries Ltd –Madras	114,700	36,800	[2]4,900 [3]3,000	[1]11,770	[1]2,400			[1]2,400 [4]25,100 [6]4,000				3,800	[1]9.5	
	Total	**866,682**	**264,070**	**104,730**	**104,070**	**26,490**	....	**13,800**	**71,820**	....	**1,375**	**11,329**	**50,728**	**9.5**	**675**
INDONESIA	Lemigas–Cepu, Central Java	1,000													
	Pertamina–Balikpapan, Kalimantan	230,500	84,100			[1]18,000	[2]49,500		[3]18,000					[1]66.6	
	Cilacap, Central Java	270,000	33,500	[1]50,000		[3]29,100		[1]15,400	[3]18,100 [5]11,800 [7]23,200			5,005	8,000		
	Dumai, Central Sumatra	90,000	83,500	[5]31,500		[2]13,600	[2]50,400		[3]9,100 [4]11,500					78.5	
	Pangakalan Brandan, North Sumatra	3,600											3,000		
	Sungai Pakning, Central Sumatra	40,700													
	Total	**635,800**	**201,100**	**81,500**		**60,700**	**99,900**	**15,400**	**91,700**	....	....	**5,005**	**11,000**	**145.1**	....
IRAN	National Iranian Oil Co –Esfahan	200,000	96,800	[1]38,000		29,600	[1]30,000		29,000				5,450	70.0	
	Shiraz	40,000	18,400	[3]8,800		6,245	[1]9,380	3,120	5,225						
	Tabriz	80,000													

			Charge capacity, b/cd							Production capacity, b/cd					
	Company and refinery location	Crude	Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons/ day
	Tehran	210,000	100,000	[3]34,000	....	28,000	[1]26,000 [2]27,800	....	....	....	....	6,000	7,000		
	Total	**530,000**	**215,200**	**80,800**	....	**63,845**	**93,180**	**3,120**	**34,225**	....	....	**5,000**	**12,450**	**70.0**	....
	Note: Present status uncertain due to Iran-iraq war.														
IRAQ	Oil Refineries Administration–Baiji	150,000	65,000			22,000 16,500	38,000	31,000 28,000 41,000	...					64.0	
	Basra	70,000	17,650									2,008			
	Daura	71,000				5,000			13,000			8,160	1,815		
	K3-Haditha	7,000													
	Khanaqin	12,000													
	Mufthia	4,500													
	Qaiyarah, Mosul	2,000											4,900		
	Iraqi Company for Oil Operations–Kirkuk	2,000													
	Total	**318,500**	**82,650**	....	....	**43,500**	**38,000**	**100,000**	**13,000**	....	....	**10,168**	**6,715**	**64.0**	....
	Note: Present status uncertain due to Iran-Iraq war.														
IRELAND	Irish Refining CL–Whitegate	**56,000**				**[2]11,000**		**[4]5,500**	**[2]11,000**						
ISRAEL	Oil Refineries Ltd.–Ashdod	70,000	35,000	[3]22,000		[2]10,000		[4]25,000	[1]13,000						
	Haifa	100,000	55,000	[3]40,000	[1]18,000	[2]14,500		[4]20,000	[1]15,000				3,000		
	Total	**170,000**	**90,000**	**62,000**	**18,000**	**24,500**	....	**45,000**	**28,000**	....	....	....	**3,000**	....	....
ITALY	ANIC SpA–Gela	80,000	32,000	[4]20,000	[1]27,000	[2]10,000		[4]25,000	[2]7,000	[2]9,000	[2]800 [4]4,000				
	Anonima Petroli Italiana–Falconara, Marittima	83,000	13,000	[2]4,500 [3]34,000		[2]11,000			[1]20,000 [4]28,500					[5]3.8	
	ERG SpA–Genoa, San Quirico	130,000		[3]38,500		[2]10,500			[1]10,500 [2]4,200 [4]29,000						
	Esso Italiana SpA–Augusta, Siracusa	180,000	80,000		[1]39,300	[1]7,600 [3]6,600			[1]14,200 [4]25,800 [6]18,500	[2]7,200	[4]4,600	12,600	9,500		
	Industrie Chimiche Italiane de Petrolio SpA–Frassino, Mantovano	55,000	7,000	[3]21,000		9,500		5,600	15,000		[6]2,500				
	Industria Italiana Petroli–Rho	79,800	29,000		[2]13,700	[2]16,000		[5]12,700	[7]21,600	[2]1,845	[1]820	1,700	7,000		
	Taranto	90,900	13,300	[6]40,900		[2]16,000		[4]12,100 [5]19,600	[7]23,400				2,500	[2]11.3	
	Iplom SpA–Busalla	46,500	12,600	[3]13,100								6,500	5,000		
	Irom–Industria Raffinazione Oli Minerali–Porto Marghera	108,000	11,000	[3]22,000		[2]16,000		[4]20,000	[2]11,000		[5]6,000		7,400		
	Isab–Melilli	220,000	105,000	[3]29,000		[4]34,500		[4]54,000 [5]55,000	[2]59,000		[6]15,000			[1]18.0	
	Lombarda Petroli SpA–Villasanta	23,500		[6]630		[6]4,000			[1]4,800						
	Mediterranea SpA–Milazzo	145,000	80,000		[1]40,000	[3]10,000		[4]20,000	[1]10,000						
	Mobil Oil Italiana SpA–Naples	100,000	22,500		[2]18,400	[2]12,500			[1]12,500 [5]23,500	[2]3,500			650		
	Raffineria del Po SpA–Sannazaro de Burgondi	230,000	64,000		[1]27,000	[2]10,500 [4]16,300		[4]37,000	[2]30,000	[2]3,600	[4]1,700				

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd				Hydrogen, MMcfd	Coke, tons/day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/isomerization	Lubes	Asphalt		
	Raffineria di Roma SpA–Rome	91,200	13,700			[2]15,100		[2]10,400	[2]22,700		[6]5,200		9,260		
	Saras SpA–Sarroch	324,000	107,500	[3]25,000	[1]63,000	[4]13,000 [6]27,000		[4]35,700 [5]17,700	[1]27,000	[2]6,800				[5]6.0	
	Sarpom–Trecate, Novara	215,000	23,000		[1]15,100	[2]19,000 [4]8,000		[4]23,000 [5]12,000	[2]63,000	*1,500			2,800		
	Selm-Soc. Energia Montedison–Priolo	300,000	50,000	[3]25,000	[1]30,000	[2]9,000		[4]18,000	[1]9,000		[1]11,000 [2]1,300				
	Soc. Petrolifera Italiana–Arcola, La Spezia	25,000													
	Stanic–Livorno	111,200	36,000			[2]19,500		[4]24,000	[1]20,000			7,500	3,500		
	Tamoil Italia SpA–Cremona	100,000		[3]33,000		[1]3,800 [2]6,400		[4]13,500	[2]14,400		[6]4,000			[5]5.5	
	Total	**2,738,100**	**699,600**	**306,630**	**273,500**	**311,800**	....	**415,300**	**524,600**	**33,445**	**56,920**	**28,300**	**47,610**	**44.6**	....
IVORY COAST	Ste. Ivoirienne de Raffinage–Abidjan	80,000	34,000			[2]14,600			[1]16,100 [2]17,400 [4]8,700						
	Ste. Multinationale de Bitumes–Abidjan	10,000	7,500										6,000		
	Total	**90,000**	**41,500**	....	....	**14,600**	....	....	**42,200**	....	....	....	**6,000**	....	....
JAMAICA	Petrojam Ltd.–Kingston	35,500	2,000			[1]3,540			[2]6,400 [4]13,200				1,000		
	Total	**35,500**	**2,000**	....	....	**3,540**	....	....	**19,600**	....	....	....	**1,000**	....	
JAPAN	Asia Kyoseki CL–Sakaide, Kagawa	135,000	36,000		[1]13,500	[2]9,000		[1]25,200 [2]48,780 [4]17,100	[1]9,000 [2]3,600				2,850	[1]32.0	
	Asia Oil CL–Hakodate	22,500	1,350			[1]1,170		[4]4,050	[1]1,170						
	Yokohama, Kanagawa	90,000				[2]12,600	[4]6,300	[1]28,800 [4]26,460	[1]12,600		[2]2,000			[1]49.0	
	Cosmo Oil CL–Chiba	209,000	57,000		[1]23,400	[2]22,500		[1]54,000 [2]31,500	[1]22,500 [2]7,200 [5]51,300					[1]21.0 [1]62.0	
	Sakai	104,500	32,300		[1]17,550	[2]6,300		[2]18,000	[1]7,650 [4]20,700					[1]10.6	
	Yokkaichi City	166,250	70,300		[1]18,000	[2]5,400 [3]7,200		[2]31,500	[1]14,400 [4]49,500 [6]5,850			5,850	6,210	[1]12.0	
	Fuji Kosan Oil CL–Kainan	77,600	44,000						9,000			13,600	17,500		
	Fuji Oil CL–Sodegaura	153,700	79,600	[4]19,000	[4]12,500	[2]13,600		[2]52,400	[1]27,000 [4]41,600 [2]6,800					[1]27.9	
	General Sekiyu Seisei KK–Sakai	108,000	47,700		[1]27,000	[2]22,500		[3]27,900	[1]36,000 [4]46,000		[1]17,100			[1]21.0	
	Idemitsu Kosan CL–Chita, Aichi	123,500				[2]16,200		[1]49,500 [4]36,000	[1]23,400					[1]63.8 [4]13.2	
	Himeji, Hyogo	10,450				[2]13,500		[1]36,000 [4]27,000	[1]22,500					[1]33.6	
	Ichihara, Chiba[1]	199,500	57,000		[1]37,800	[2]15,300	[3]9,450	[1]36,000 [4]47,700	[1]38,700 [2]5,400			5,170		[1]64.9 [1]3.5	
	Tokuyama, Yamaguchi	95,000	66,500		[1]20,700	[2]10,800		[2]40,500 [4]31,500	[1]13,500				1,530	[1]18.0	
	Tomakomai, Hokkaido	85,500				[2]16,200	[1]13,500	[4]22,860	[1]24,300					[4]2.4	

		Charge capacity, b cd							Production capacity, b cd					
Company and refinery location	Crude	Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons day
Kashima Oil CL–Kashima, Ibaragi	150,000	67,000		[1]14,000	[4]12,500		[1]20,000 [2]25,000 [4]29,000	[2]14,500					[1]22.5	
Koa Oil CL–Marifu	125,100	50,400	[5]20,520	[1]14,400	[2]8,730		[2]9,000	[1]9,900 [4]26,100				1,530	[2]5.9	450
Osaka	72,000	49,500		[1]16,200	[2]8,100		[2]13,500	[1]9,900 [4]10,800						
Kyokuto Petroleum Ltd.–Chiba	143,000	85,000			[2]14,500	[1]28,000		[1]16,000 [4]27,000					[2]20.0	
Kyushu Oil CL–Oita	130,000	66,000		[1]16,500	[2]8,000		[2]33,000 [4]22,000	[1]9,000					[5]14.9	
Maruzen Oil CL–Matsuyama					[1]4,050			[1]6,840 [4]8,910		[1]1,800				
Shimotsu								[6]2,070			1,170			
Mitsubishi Oil CL–Kawasaki	75,000	5,800			[2]15,000		[4]29,500	[1]18,500				1,100		
Mizushima	220,000	97,000		[1]30,000	[2]30,100		[1]45,000 [2]30,000 [3]30,000 [4]25,000	[1]28,000 [3]14,000 [6]4,100	*880	[1]11,700	2,800	6,400	[2]60.0	
Nichimo Sekiyu Seisei KK–Kawasaki	76,000				[1]7,600			[1]7,200 [4]22,800						
Nihonkai Oil CL–Toyama	60,000													
Nippon Mining CL–Chita	85,000	46,000		[1]10,000	[2]22,000		[2]37,000	[2]43,000 [4]46,000		[1]4,600 [2]2,000 [3]1,300			[1]25.0	
Funakawa	6,000	2,740									1,070			
Mizushima	190,200	101,000		[1]35,000	[2]20,000	[1]3,000	[1]31,000 [2]60,000	[2]28,300 [4]49,100 [5]6,000			4,900		[1]29.0 [2]30.0	
Nippon Oil CL–Niigata	28,000	2,000			[2]5,100			[5]21,300				425		
Nippon Petroleum Refining CL–Kudamatsu	22,000	4,500			[2]1,300			[2]5,700 [5]6,200			600	1,080		
Muroran	150,000	50,000		[1]19,000	[2]19,000		[1]25,000 [2]40,000	[2]32,000 [5]48,000				4,160	[5]62.0	
Negishi	305,000	110,000	[1]20,000	[1]36,000	[2]33,000		[2]81,000	[2]41,000 [5]69,000			4,310	6,660	[5]22.0	
Yokohama	55,000	25,000			[2]1,800			[1]3,300 [5]7,300			2,380	2,500		
Seibu Sekiyu KK–Onoda	134,000				17,000		65,000	72,000						
Showa Shell Sekiyu KK–Kawasaki	135,000				20,000		41,000	26,000						
Niigata	30,000				4,400		2,000	12,000						
Showa Yokkaichi Sekiyu KK–Yokkaichi	207,000			15,000	38,000		71,000	92,000						
Taiyo Oil CL–Ehime	65,000	4,000			[2]5,000			[1]8,200 [4]12,000						
Toa Nenryo Kogyo–Kawasaki	190,000	116,900		[1]68,400	[2]15,200		[3]74,000	[2]32,300 [4]31,400 [5]11,400					[2]39.0	
Shimizu	28,500				[2]4,400			[2]9,000 [4]9,500						
Wakayama	162,500	74,200		[1]27,800	[2]34,200		[2]23,800	[2]33,700 [4]39,000 [5]20,900	[1]1,400		6,300		[1]16.0	
Toa Oil CL–Kawasaki	65,000	53,000	[6]21,000		[2]11,000			[1]17,000 [3]3,500 [4]22,000 [5]46,000					[5]34.7	150

			Charge capacity, b cd							Production capacity, b cd					
WORLDWIDE REFINING	Company and refinery location	Crude	Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons day
LIBERIA	Liberia Petroleum Refining–Monrovia	15,000	1,000			[1]2,000			[1]2,300 [4]1,000				200		
	Total	**15,000**	**1,000**	....	....	**2,000**	....	....	**3,300**	....	....	....	**200**	....	....
LIBYA	Azzawiya Oil Refining Co.–Azzawiya	120,000	3,432			[1]12,982			16,908 [5]18,718				1,716		
	Ras Lanuf Oil & Gas Processing Co.–Ras Lanuf	201,000													
	Sirte Oil Co.–Brega	8,800				[1]1,200		[1]2,500							
	Total	**329,800**	**3,432**	....	....	**14,182**	....	**2,500**	**35,626**	....	....	....	**1,716**	....	....
MADAGASCAR	Solima–Managareza, Tamatave	**16,350**	....	....	....	**[4]2,600**	....	....	**[1]5,500**	....	....	....	....	....	....
MALAYSIA	Esso Malaysia Berhad–Port Dickson	47,300	4,750			[2]6,900			[1]11,400 [4]13,600						
	Petronas Penapisan Sdn. Berhad–Kerteh, Kemaman, Terengganu	30,000													
	Sarawak Shell Berhad–Luton	45,000													
	Shell Refining Co. Berhad–Port Dickson	90,000				14,000		5,000	28,000						
	Total	**212,300**	**4,750**	....	....	**20,900**	....	**5,000**	**53,000**	....	....	....	....	....	....
MARTINIQUE	Ste. Anonyme de la Raffinerie des Antilles–Fort-de-France	12,800				[2]3,000			[1]4,850 [4]3,500						
	Total	**12,800**	....	....	....	**3,000**	....	....	**8,350**	....	....	....	....	....	....
MEXICO	Petroleos Mexicanos–Azcapotzalco	105,000	48,000	[1]20,000	[1]23,000				[2]26,000	[2]3,000					
	Cadereyta	235,000	137,000		[1]40,000	[4]20,000			[2]36,000 [4]50,000						
	Ciudad Madero	185,000	80,000	[3]8,000 [4]9,000	[1]51,000	[6]15,000			[2]18,000 [4]40,000	[2]3,000				[5]10.0	
	Minatitlan	199,000	80,000		[1]24,000 [2]21,000	[5]54,000			[2]46,000 [4]54,000	*600	[1]1,078 [2]1,417 [3]2,129				
	Poza Rica	16,000						[5]5,000							
	Reynosa	9,000													
	Salamanca	200,000	98,000	[1]4,000	[1]40,000 [2]18,000	[6]24,800	[2]18,000		[2]35,000 [4]36,000			9,000		[5]60.0	
	Salina Cruz	170,000	75,000		[1]40,000	[6]20,000			[2]25,000 [4]50,000						
	Tula, Hidalgo	150,000	75,000	[1]41,000	[1]40,000	[3]30,000			[2]36,000 [4]50,000						
	Total	**1,269,000**	**593,000**	**82,000**	**297,000**	**163,800**	**18,000**	**5,000**	**502,000**	**6,600**	**4,624**	**9,000**	....	**70.0**	....
MOROCCO	Samir–Mohammedia	55,703	5,760			[4]10,935			[1]12,029 [4]7,613			1,514			
	Ste. Cherifienne des Petroles–Sidi Kacem	25,600	7,400		[5]5,600	[1]2,800			[1]2,800						
	Total	**81,303**	**13,160**	....	**5,600**	**13,735**	....	....	**22,442**	....	....	**1,514**	....	....	....

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd					
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons/ day
MOZAMBIQUE	Petromoc EE–Matola-Lingamo	**17,000**	**1,500**	....	....	**[1]2,500**	....	**[4]2,500**	....	....	....	....	**900**	....	....
NETHERLANDS	BP Raffinaderij Nederland NV–Rotterdam	437,000	73,000	[3]35,000	[1]47,500	[2]27,000		[4]33,200	[2]148,000	[2]4,700	....	....	....	....	....
	Esso Nederland BV–Rotterdam	154,850			....	[4]25,200	....	....	[1]25,200 [4]61,290		....	....	....	....	....
	Kuwait Petroleum Europoort BV–Europoort	75,500	32,870	[2]9,460 [3]6,550	....	[2]8,200		....	[2]12,120 [4]28,170 [6]5,130	....		4,000	8,500	....	
	Shell Nederland Raffinaderij BV–Pernis	436,000	....	[2]45,000	[1]75,000	45,000		112,000	136,000	....	....	....	....		
	Smid & Hollander Raffinaderij BV–Amsterdam	8,000	8,000					....	....	....	....	....	6,000	....	....
	Texaco Petroleum Mij (Nederland) BV–Pernis	207,000	28,000	[3]24,000		[2]29,000		[4]38,000	[1]29,000						
	Total Raffinaderij Nederland NV–Vlissingen	150,000				[2]14,000	....	....	[1]18,000 [4]18,000 [5]25,000	....					
	Total	**1,468,350**	**141,870**	**120,010**	**122,500**	**148,400**	....	**183,200**	**505,910**	**4,700**	....	**4,000**	**14,500**	....	....
NETHERLANDS ANTILLES	Refineria Isla Curazao SA–Emmastad	320,000	158,000	[3]67,000	[1]42,000	[2]15,000			[2]60,000 [4]34,000 [5]25,000 [6]2,500	[2]5,000 *600		8,000	8,000		
	Total	**320,000**	**158,000**	**67,000**	**42,000**	**15,000**	....	....	**121,500**	**5,600**	....	**8,000**	**8,000**	....	....
NEW ZEALAND	New Zealand Refining–Whangarei	**53,000**	....	....	....	**18,000**	....	**6,400**	**37,000**	....	....	....	....	....	....
NICARAGUA	Esso Standard Oil SA Ltd –Managua	14,500				[1]2,800			[2]3,600 [7]4,800	....	....	....	2,000	....	....
	Total	**14,500**	....	....	....	**2,800**	....	....	**8,400**	....	....	....	**2,000**	....	....
NIGERIA	Nigerian Petroleum Refining CL–Kaduna	90,400	34,600		[1]18,100	[1]15,400		....	[1]21,700 [4]15,800 [7]530	....		4,900	14,100		
	Port Harcourt, Alesa Eleme	60,000				[1]6,000				....	....	....	....		
	Warri	100,000	32,000		[1]26,000	[2]16,700		....	[1]16,700 [5]8,600	....	....	....	....	....	....
	Total	**250,400**	**66,600**	....	**44,100**	**38,100**	....	....	**63,330**	....	....	**4,900**	**14,100**	....	....
NORWAY	Esso Norge AS–Slagen-Valloy	90,000	3,000	[2]13,500 [3]31,000		[2]9,150		[5]8,500	[1]17,500	....	....	....	2,000	....	....
	Norske Shell AS–Sola	60,000		[2]26,000		10,000		9,000	16,000	....	....	....	....	....	....
	Rafinor AS-Mongstad	90,000		[5]20,000		[2]10,000			[1]10,000 [5]16,000	....	[6]3,000	....	....	....	480
	Total	**240,000**	**3,000**	**90,500**	....	**29,150**	....	**17,500**	**59,500**	....	**3,000**	....	**2,000**	....	**480**

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd				Hydrogen, MMcfd	Coke, tons/day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt		
OKINAWA	Nansei Sekiyu KK–Nishihara	45,000		....		[1]5,400	....	....	[2]21,000 [4]13,500	....	....	....	....	....	....
	Nippon Petroleum Refining CL–Nakagusuku	8,000				[2]2,000	....	....	[2]2,000	....					
	Okinawa Sekiyu Seisei–Yonashiro	57,000				....	....	[1]34,200 [4]31,500	....	....			....	[2]42.7	
	Total	**110,000**	....	....	....	**7,400**	....	**65,700**	**36,500**	....	....	....	....	**42.7**	....
OMAN	Oman Refinery Co.–Mina Al Fahal	**48,082**	....	....	....	**[2]9,644**	....	....	**[2]12,425**	....	....	....	....	....	....
PAKISTAN	Attock Refinery Ltd.–Rawalpindi	36,000	1,000									115	100		
	National Refinery Ltd.–Korangi, Karachi	47,750	13,200			[2]2,750			[1]2,800 [4]4,000		[1]1,250	3,700	3,950	[1]0.1	
	Pakistan Refinery Ltd.–Karachi	46,250				[1]3,000			[7]21,000						
	Total	**130,000**	**14,200**	....	....	**5,750**	....	....	**27,800**	....	**1,250**	**3,815**	**4,050**	**0.1**	....
PANAMA	Refineria Panama SA–Las Minas	100,000	14,000			[2]7,500			[1]10,000 [4]20,000				5,000		
	Total	**100,000**	**14,000**	....	....	**7,500**	....	....	**30,000**	....	....	....	**5,000**	....	....
PARAGUAY	Petroleos Paraguayos–Villa Elisa	**7,500**	....	....	....	....	....	....	....	....	....	....	....	....	....
PERU	Petroleos del Peru														
	Conchan	6,290	4,020												
	Iquitos, Loreto	9,860													
	La Pampilla, Lima	93,900	11,090		[1]6,230	[1]1,680									
	Marsella, Loreto	2,040													
	Pucallpa	2,440													
	Talara	61,030	22,180		[1]15,440							1,080	1,530		
	Total	**175,560**	**37,290**	....	**21,670**	**1,680**	....	....	....	....	....	**1,080**	**1,530**	....	....
PHILIPPINES	Bataan Refining Corp.–Limay	85,000	20,000		[2]15,000	[1]17,000		[4]18,000	[1]17,000 [2]16,000				5,000		
	Caltex (Philippines) Inc.–Batangas	63,000	18,100		[1]8,100	[2]8,100			[1,2]10,800 [4]14,400						
	Pilipinas Shell Petroleum–Tabangao	68,000				8,300		5,500	15,500						
	Total	**216,000**	**38,100**	....	**23,100**	**33,400**	....	**23,500**	**73,700**	....	....	....	**5,000**	....	....
POLAND	Government-owned refineries at Czechowice, Gdansk, Glinik Mariampolski, Jasto, Jealicze, Kralaty, L. Warynski, Plock, Trzebinia. Of these, Plock is by far the largest, accounting for roughly 80% of Polish refinery production. Its crude capacity is nearly 300,000 b/d.														
	Total	**385,000**													
PORTUGAL	Petrogal–Lisbon		12,478		[2]10,141			[3]3,690					892		
	Leça da Palmeira, Porto	89,100	10,966			[6]10,669			[1]12,392 [4]9,040 [6]585		[1]6,950	2,910	1,152		
	Sines	206,507	23,312			[6]25,240	[1]9,362	[2]13,767 [4]28,819	[1]25,240				2,203		
	Total	**295,607**	**46,756**	....	**10,141**	**35,909**	**9,362**	**46,276**	**47,257**	....	**6,950**	**2,910**	**4,247**	....	....

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd					
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons/ day
PUERTO RICO	Chevron Oil Co –Bayamon	36,000	19,300		^{1}12,000	^{2}5,800			^{2}5,900 ^{4}9,800	*1,000			900		
	Yabucoa Sun Oil Co –Yabucoa^{1}	85,000	40,000				^{3}15,000	^{4}10,000				6,800		^{2}17.0	
	Total	**121,000**	**59,300**	....	**12,000**	**5,800**	**15,000**	**10,000**	**15,700**	**1,000**	....	**6,800**	**900**	**17.0**	....
	Solvent extraction ^{1}7,000														
QATAR	National Oil Distribution Co – Umm Said	56,058				^{2}1,576 ^{4}8,887		^{1}10,850	^{1}18,760 ^{4}8,950						
	Total	**56,058**	....	....	....	**10,463**	....	**10,850**	**27,710**	....	....	....	....	....	....
RUMANIA	Government-owned refineries at Bacau, Borzesti Brazi, Brazov, Cimpina, Darmanesti, G Gheorghiu Dej, Navodari, Onesti, Pitesti, Ploesti, Sulpacu, and Telaejen														
	Total	**617,000**													
SAUDI ARABIA	Arabian American Oil Co – Ras Tanura	450,000													
	Jeddah Oil Refinery–Jeddah	91,000	15,500		^{1}10,000	^{2}2,900			^{1}2,900						
	Petromin-Shell–Al-Jubail^{1}	270,000	70,000	^{3}30,000		16,000	40,000	^{2}45,000 ^{4}45,000	^{3}16,000				12,700	^{1}64.0	
	Riyadh Oil Refinery–Riyadh^{2}	134,000	52,655			^{2}28,600 ^{5}5,400	^{2}31,100		^{2}30,900 ^{4}12,900		8,000			117.0	
	Yanbu Domestic Refinery–Yanbu	170,000				^{2}35,000			^{2}35,000 ^{4}15,200						
	Total	**1,115,000**	**138,155**	**30,000**	**10,000**	**87,900**	**71,100**	**90,000**	**112,900**	....	**8,000**	....	**12,700**	**181.0**	....
	Solvent extraction ^{1}12,500 b/cd ^{2}8,800 b/cd														
SENEGAL	Ste. Africaine de Raffinage– M'Bao (Dakar)	**29,800**	**18,800**	....	....	**^{4}2,870**	....	....	**^{2}2,870**	....	....	....	....	....	....
SIERRA LEONE	Sierra Leone Petroleum Refining Co –Freetown	**10,000**	....	....	....	....	....	....	....	....	....	....	....	....	....
SINGAPORE	BP Refinery Singapore PL Pasir Panjang	28,000													
	Esso Singapore PL–Pulau Ayer Chawan	176,000	41,800			^{2}8,600			^{2}19,000 ^{4}48,400			7,000	3,400		
	Mobil Oil Singapore PL–Jurong	193,000	70,000	^{3}45,000		^{1}3,000 ^{2}10,000		^{4}5,700	^{1}16,800 ^{5}28,000						
	Shell Eastern Petroleum Ltd – Pulau Bukom	460,000		^{7}60,000		17,000	17,700	35,000	160,000						
	Singapore Refinery CPL†– Pulau Merlimau	161,000	36,000	^{3}28,000		^{4}11,000	^{4}17,000	^{4}36,000	^{1}11,000				4,300	^{2}18.0 ^{4}14.0	
	Total	**1,018,000**	**147,800**	**133,000**	....	**49,600**	**34,700**	**76,700**	**283,200**	....	....	**7,000**	**7,700**	**32.0**	....

---

†Singapore Petroleum CPL shares percentages of refinery capacities

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd					Coke, tons/day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt	Hydrogen, MMcfd	
SOMALIA	Iraqsoma Ref. Co.–Mogadishu	**10,000**	....	....	....	....	....	....	....	....	....	....	....	....	....
SOUTH AFRICA	Caltex Oil SA PL–Cape Town	90,000	44,000	[3]9,500	[1]25,000	[2]10,500		[4]22,300	[1]14,250			....	1,140		
	Mobil Oil Refining Co – Southern Africa PL–Durban	65,000	32,000	[3]11,000	[1]15,000	[2]19,000			[1]21,000 [5]28,000	[2]2,200	[1]1,700		4,000		
	†Durban								....	....		3,000	....	....	....
	National Petroleum Refiners of South Africa PL–Sasolburg OFS	78,500	28,000		[1]16,000	[2]12,000	[1]7,200 [2]9,300		28,000	[2]4,500	[4]3,400	....	900	[1]30.0	
	Shell and BP South Africa Petroleum Refineries PL–Durban	155,000	73,000	[3]39,000	[1]24,000	[2]21,000		[4]44,000	[4]40,000	[2]2,100		....	1,000	....	....
	Total	**388,500**	**177,000**	**59,500**	**80,000**	**62,500**	**16,500**	**66,300**	**131,250**	**8,800**	**5,100**	**3,000**	**7,040**	**30.0**	....
SPAIN	Asfaltos Españoles SA–Tarragona	21,000	16,800										13,200		
	Cia. Espanola de Petroles–San Roque (Cadiz)	176,000	40,000	[1]35,000	[1]25,000	[2]35,000			[4]24,000 [5]15,000		[1]12,500 [2]1,800				
	Tenerife	176,000	12,000	[1]35,000		[2]19,000			[4]20,000			900	8,000		
	EMP–Cartagena, Murcia	112,000	18,000			[2]25,000		[4]30,000	[2]29,000			3,500	3,500		
	La Coruña	135,000	29,000	[2]10,500 [3]13,500	[1]25,000	[2]18,500		[4]17,000	[1]18,500						3,400
	Puertollano, Ciudad Real	135,000	64,000		[1]23,500	[2]18,000		[2]9,500 [4]21,000	[2]18,000 [3]2,400 [6]1,900		[2]1,700	3,000	3,500	[2]6.2	
	Tarragona	180,000	63,000	[1]30,000		[2]16,000	[1]11,000	[2]22,000 [4]20,600	[2]16,000					[1]10.0	
	Petroleos del Mediterraneo–Castellon de la Plana	112,000	24,000		[1]14,000	[2]14,000		[2]11,000 [4]25,000	[1,2]25,000				1,650		
	Petronor SA–Somorrostro, Vizcaya	240,000				[2]33,500			[2]48,600 [4]40,700						
	Union Explosivos Rio Tinto SA–La Rabida, Huelva	80,000	25,000			[2]14,100			[1]14,100 [4]8,000 [6]2,800		[1]2,420 [2]3,500 [3]1,800	1,900	6,900	[1]25.0 [5]6.0	
	Total	**1,367,000**	**291,800**	**124,000**	**87,500**	**193,100**	**11,000**	**156,100**	**284,000**	....	**23,720**	**9,300**	**36,750**	**47.2**	**3,400**
SRI LANKA	Ceylon Petroleum Corp – Sapugaskanda	[illegible]	1,900	[3]12,500		[2]3,750		[2]2,100	[1]8,000 [4]7,300				950		
	Total	**50,000**	**1,900**	**12,500**	....	**3,750**	....	**2,100**	**15,300**	....	....	....	**950**	....	....
SUDAN	Port Sudan Refinery Ltd.–Port Sudan	**23,800**	....	....	....	**[1]1,700**	....	....	**[4]7,400**	....	....	....	....	....	....
SWEDEN	AB Nynas Petroleum–Gothenburg	12,000	12,000										8,500		
	Malmoe	3,000													
	Nynashamn	28,000	31,000						[6]2,300			2,600	19,500	[2]0.9	
	BP Raffinaderi–Gothenburg	96,000				[1]18,700			[4]42,000						

†South African Oil Refinery PL is owner. Mobil is operator

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd					
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons/ day
	Skandinaviska Raffinaderi AB–Brofjorden-Lysekil	210,000	68,000	^{3}44,444	^{1}26,666	^{4}38,888	....	^{3}50,000 ^{4}27,777	^{2}44,444	*3,888	....	....	....	....	....
	Svenska Shell–Gothenburg	80,000	....	^{2}28,000	....	17,000	....	16,000	27,000	....					
	Total	**429,000**	**111,000**	**72,444**	**26,666**	**74,588**	....	**93,777**	**115,744**	**3,888**	....	**2,600**	**28,000**	**0.9**	....
SWITZERLAND	Raffinerie du Sud-Ouest SA–Collombey	72,000	....	....	....	^{2}10,000	....	....	^{1}16,700	....	....	....	....	....	....
	Shell Switzerland–Cressier	65,000	....	^{1}24,000	....	15,000	....	8,000	27,000	....	....	....	....	....	....
	Total	**137,000**	....	**24,000**	....	**25,000**	....	**8,000**	**43,700**	....	....	....	....	....	....
SYRIA	Banias Refining Co.–Banias	126,350	54,101	^{3}24,099	....	^{3}16,728	....	....	^{1}16,769 ^{4}6,828 ^{6}14,266	....	....	....	4,016	....	....
	Homs Refinery Co.–Homs	102,440	6,510	^{5}17,100	....	^{3}2,620	....	^{4}26,040	....	....	....	....	4,020	9.5	685
	Total	**228,790**	**60,611**	**41,199**	....	**19,348**	....	**26,040**	**37,863**	....	....	....	**8,036**	**9.5**	**685**
TANZANIA	Tanzanian & Italian Petroleum Refining CL–Kigamboni, Dar es Salaam	**13,500**	....	....	....	**^{2}3,000**	....	....	**^{4}5,000**	....	....	....	....	....	....
THAILAND	Esso Standard Thailand Ltd.–Cholburi	63,000	5,700	....	....	^{2}6,700	....	....	^{2}12,400 ^{4}18,600	....	....	....	3,000	....	....
	Petroleum Authority of Thailand–Bangchak, Bangkok	65,000	....	....	....	^{2}10,500	....	....	^{1}5,500 ^{2}6,500 ^{7}18,000	....	....	....	....	^{1}4.7	....
	Thai Oil Refinery CL–Sriracha, Cholburi	63,860	18,750	^{3}9,600	^{1}9,250	^{1}2,800 ^{2}5,300	....	^{2}10,000	^{4}32,000	....	....	....	1,100	....	....
	Total	**191,860**	**24,450**	**9,600**	**9,250**	**25,300**	....	**10,000**	**93,000**	....	....	....	**4,100**	**4.7**	....
TOGO	Ste. Togolaise des Hydrocarbures–Lome	**20,000**	....	....	....	**^{4}4,400**	....	....	**^{1}7,600**	....	....	....	....	....	....
TRINIDAD	Trinidad and Tobago Oil CL–Pointe-a-Pierre	220,000	166,000	^{3}18,000	^{1}25,000	^{4}25,000	....	^{2}100,000	^{5}20,000 ^{6}3,800	*450	^{1}2,800	3,800	....	....	....
	Point Fortin	40,000	4,000	....	....	^{1}4,000	....	^{5}2,500	^{4}14,000	....	....	....	1,500	....	....
	Total	**260,000**	**170,000**	**18,000**	**25,000**	**29,000**	....	**102,500**	**37,800**	**450**	**2,800**	**3,800**	**1,500**	....	....
TUNISIA	Ste. Tunisienne Industries des Raffinage–Bizerte	**34,000**	....	....	....	**3,300**	....	....	....	....	....	....	....	....	....
TURKEY	Anadolu Tasfiyehanesi AS–Mersin	90,000	....	....	....	^{2}10,500	....	....	^{1}22,000 ^{4}11,500	....	....	....	....	....	....
	Turkish Petroleum Refineries Corp. Aliaga-Izmir[1]	102,020	33,208	....	^{1}14,000	^{2}9,827	....	^{2}4,777	^{2}13,649 ^{7}5,460	....	....	3,830	5,441	^{5}0.4	....
	Batman	20,000	3,500	....	^{2}4,500	^{1}1,300	....	....	^{2}1,300	....	....	....	3,500	....	18

		Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd				Hydrogen, MMcfd	Coke, tons/day
				Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt		
		Izmit	248,455	88,060		[1]20,100	[2]23,430			[1]26,600 [2]6,300 [4]45,300				8,800		
		Total	**460,475**	**124,768**	**....**	**38,600**	**45,057**	**....**	**4,777**	**132,109**	**....**	**....**	**3,830**	**17,741**	**0.4**	**18**

Solvent extraction [1]10,273 b/cd (furfural), 6,038 b/cd (propane deasphalting)

		Company and refinery location	Crude	Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics/ isomerization	Lubes	Asphalt	Hydrogen, MMcfd	Coke, tons/day
UNITED KINGDOM	**England**	Conoco Ltd – South Killingholme	130,000	55,000	[2]55,000 [5]60,000		[2]64,000			[4-5]143,000		[2]3,000 [6]19,000				1,900
		Esso Petroleum CL–Fawley	300,200	120,840		[1]76,500	[2]27,900 [4]22,500			[1-2]73,260 [4-5]104,130 [6]7,200	*12,600		7,200	7,650		
		Lindsey Oil Refinery Ltd – Killingholm, South Humberside	190,000	80,000	[3]26,000	[1]35,000	[2]33,600		[4]40,600	[1-2]45,400 [3]3,600	[1]4,100 *1,900			7,100		
		Mobil Oil CL–Coryton, Essex	145,000	70,000		[1]47,000	27,000			[1]35,000 [5]33,000	[2]13,500	[4]8,500	5,500	1,700		
		Phillips Imperial Petroleum Ltd – Port Clarence	100,000													
		Philmac Oils Ltd – Eastham, Cheshire	12,000	10,500										8,000		
		Shell U.K. Ltd – Shell Haven	90,000			18,000	32,000		17,000	62,000						
		Stanlow	256,000			55,000	55,000		41,000	77,000						
		Total	**1,223,200**	**336,340**	**141,000**	**231,500**	**262,000**	**....**	**98,600**	**583,590**	**32,100**	**30,500**	**12,700**	**24,450**	**....**	**1,900**
	Scotland	BP Refinery Grangemouth Ltd – Grangemouth	178,500	76,000		[1]19,000	[2]32,000	[1]29,000		[4]62,500	[2]3,800				[1]77.4	
		Shell U.K. Ltd – Ardrossan	5,000													
		Total	**183,500**	**76,000**	**....**	**19,000**	**32,000**	**29,000**	**....**	**62,500**	**3,800**	**....**	**....**	**....**	**77.4**	**....**
	Wales	Amoco UK Ltd – Milford Haven	102,000	48,500		[1]31,500	[2]17,500			[2]17,500 [4]29,000	[2]3,100 †1,200					
		BP Refinery Llandarcy Ltd – Llandarcy, Neath		27,000									4,400			
		Chevron Oil Co – Milford Haven	103,000	37,000			[2]22,000			[2]32,000 [4]14,000						
		Pembroke Cracking Co. (65% Texaco, 35% Chevron)				[1]81,500					[2]7,350	[4]4,165				
		Texaco Ltd – Pembroke, Dyfed	180,000	95,000	[3]25,000		[6]35,000		[4]33,000	[1]28,000						
		Total	**385,000**	**207,500**	**25,000**	**113,000**	**74,500**	**....**	**33,000**	**120,500**	**11,650**	**4,165**	**4,400**	**....**	**....**	**....**
		Total United Kingdom	**1,791,700**	**619,840**	**166,000**	**363,500**	**368,500**	**29,000**	**131,600**	**766,590**	**47,550**	**34,665**	**17,100**	**24,450**	**77.4**	**1,900**

---

†Dimersol

WORLDWIDE REFINING	Company and refinery location	Crude	Charge capacity, b/cd							Production capacity, b/cd				Hydrogen, MMcfd	Coke, tons/day
			Vacuum distillation	Thermal operations	Catalytic cracking	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics/isomerization	Lubes	Asphalt		
URUGUAY	Administracion Nacional de Combustibles. Alcohol y Portland–La Teja, Montevideo	45,000	12,000		[1]5,000	[1]3,000	....		[1]3,000 [4]5,000	....	....		3,000		
	Total	**45,000**	**12,000**	....	**5,000**	**3,000**	....	....	**8,000**	....	....	....	**3,000**	....	....
U.S.S.R.	Government-owned refineries at Achinsk, Angarsk, Baku, Batumi, Drogobych, Fergana, Gorki, Grozny, Guryev, Ishimbai, Khabarovsk, Kherson, Kirishi, Komsomolsk, Krasnovodsk, Kremenchug, Kuibyshev, Lisichansk, Mazheikiai, Moscow, Mozyr, Nadvornaya, Nizhnekamsk, Odessa, Omsk, Orsk, Pavlodar, Perm, Polotsk, Ryazan, Saratov, Syzran, Tuapse, Ufa, Ukhta, Vannovskiy, Volgograd, and Yaroslavl														
	Total	**12,000,000**													
VENEZUELA	Corpoven–El Palito	105,000	63,200		[1]39,100	[1]6,000		....	....	[2]20,500					
	El Toreno	5,000													
	Maracaibo	57,000	11,000										8,100		
	Lagoven–Judibana	600,000	343,600	[6]47,000	[1]71,300			[2]162,000 [4]61,000	[4]10,000	[2]16,000	[4]8,400	1,400	39,800	[1]83.0	100
	Maraven–Punta Cardon	265,000	132,000	[2]75,000	[1]57,600			[2]31,500 [4]43,200		[2]22,650	[4]10,000	5,500		[1]26.0	
	Meneven–Puerto La Cruz	192,500			[1]11,400					[2]1,900					
	San Roque	5,200	1,700												
	Total	**1,229,700**	**551,500**	**122,000**	**179,400**	**6,000**	....	**297,700**	**10,000**	**61,050**	**18,400**	**6,900**	**47,900**	**109.0**	**100**
VIRGIN ISLANDS	Hess Oil Virgin Islands Corp.–St. Croix	600,000	190,000	[1]40,000		[2]125,000		[2]130,000	[2]125,000 [4]165,000		[1]30,000 [5]15,000				
	Total	**600,000**	**190,000**	**40,000**	....	**125,000**	....	**130,000**	**290,000**	....	**45,000**	....	....	....	....
YEMEN, S.	Aden Refinery Co.–Little Aden	**161,500**	**9,500**	....	....	**[1]10,800**	....	....	....	....	....	....	....	....	....
YUGOSLAVIA	Bosanski Brod	43,129	19,289			[2]6,360	[1]7,456		[1]6,360				5,110	[1]14.0	
	Lendava	18,100													
	Novi Sad	11,100													
	Pancevo	29,878				3,996		8,793							
	Rijeka	160,000	15,800	[3]6,100		18,500		3,000	5,000		3,300 6,300	1,900	5,000		
	Sisak	18,800	2,650		[1]1,960	16,300		2,700	17,200				1,500		240
	Zagreb	600	500									1,200			
	Total	**301,617**	**38,239**	**6,100**	**1,960**	**45,156**	**7,456**	**14,493**	**28,560**	....	**9,600**	**3,100**	**11,610**	**14.0**	**240**
ZAIRE	Soc. Zairo-Italienne de Raffinage–Muanda	17,000				[1]3,000			[1]3,000 [7]2,000						
	Total	**17,000**	....	....	....	**3,000**	....	....	**5,000**	....	....	....	....	....	....
ZAMBIA	Indeni Petroleum Refinery CL–Bwana Nkubwa Area, Ndola	**25,000**	**2,400**	....	....	**[4]5,600**	....	....	**9,000**	....	....	....	**960**	....	....

Annual refining survey

Ailleen Cantrell
Director of Editorial Surveys

FOR a better understanding of the survey the following information may be of help.

Calendar-day figures reported in this survey are the average volume a refinery unit processes each day including downtime used for turnarounds. This is actual total volume for the year divided by 365.

Stream-day figures represent the amount a unit can process when running full capacity for short periods.

This survey includes only facilities charging whole crude, plus lube plants not charging whole crude.

Totals. The term NR means not reported. When this term appears in the crude columns, the totals reflect conversion to either a stream-day or calendar-day basis to make each column complete.

Crude conversion factor is 0.95.

In the case of catalytic cracking, if a recycle capacity was not reported, state totals will include a volume that is 30% of the fresh feed reported.

Legend. Hydrocracking includes those processes where 50% or more of the feed is reduced in molecular size; for hydrorefining 10% of the feed or less is reduced in molecular size; and for hydrotreating, essentially no reduction in molecular size of feed occurs.

Values for hydrogen volumes represent either generation or upgrading to 90+ % purity.

Cat reforming definitions are:

- Semiregenerative is characterized by shutdown to the reforming unit at specified intervals or at the operator's convenience for regeneration of catalyst in situ.
- Cyclic is characterized by continuous or continual regeneration of catalyst in situ in any one of several reactors that can be isolated from and returned to the reforming operation. This is accomplished without changing feed rate or octane.
- Other includes: Nonregenerative—catalyst replaced by fresh catalyst; continuous — continuous regeneration of a part of the catalyst in a special regenerator followed by continuous addition to the reactor; moving-bed catalyst systems.

Detailed U.S. breakdown by company, plant, and state starts next page. Included are:

- U.S. crude capacity and downstream production by states.
- Detailed U.S. survey.
- Inactive refineries.

INACTIVE REFINERIES

1. Allied Materials Corp., Stroud, Okla.—8,500 b/cd.
2. Caribou Four Corners Inc., Woods Cross, Utah—8,400 b/cd.
3. Celeron Oil & Gas Co., Mermentau, La.—14,000 b/cd.
4. Champlin Petroleum Co., Enid, Okla.—53,800 b/cd.
5. Dorchester Refining Co., Mt. Pleasant, Texas—26,500 b/cd.
6. Eco Petroleum Inc., Signal Hill, Calif.—10,000 b/sd.
7. Eddy Refining Co., Houston, Texas—3,500 b/sd.
8. Flint Chemical Co., San Antonio, Texas—1,400 b/cd.
9. Golden Eagle Refining Co., Carson, Calif.—16,500 b/cd.
10. Hill Petroleum Co., Krotz Springs, La.—48,000 b/cd.
11. Hunt Oil Co., Tuscaloosa, Ala.—44,500 b/cd.
12. Independent Valley Energy Co., Bakersfield, Calif.—28,000 b/sd.
13. Marlex Oil & Refining Inc., Long Beach, Calif.—20,000 b/sd.
14. Mobile Bay Refining Co., Chicasaw, Ala.—20,000 b/cd.
15. Natchez Refining Inc., Natchez, Miss.—15,000 b/cd.
16. Oklahoma Refining Co., Cyril, Okla.—9,200 b/cd.
17. Oklahoma Refining Co., Thomas, Okla.—9,800 b/cd.
18. Paramount Petroleum Corp., Paramount, Calif.—46,500 b/cd.
19. Port Petroleum Inc., Stonewall, La.—3,200 b/cd.
20. Powerine Oil Co., Santa Fe Springs, Calif.—44,120 b/cd.
21. Quintana Petrochemical Co., Corpus Christi, Texas—35,000 b/sd.
22. Southern Union Refining Co., Lovington, N.M.—36,100 b/cd.
23. South Hampton Refining Co., Silsbee, Texas—19,000 b/cd.
24. Sunland Refining Corp., Bakersfield, Calif.—15,000 b/cd.
25. Tesoro Petroleum Corp., Carrizo Springs, Texas—26,100 b/cd.
26. Thriftway Co., Bloomfield, N.M.—6,515 b/cd.
27. Tonkawa Refining Co., Arnett, Okla.—12,000 b/cd.
28. United Refining Co., Warren, Pa.—60,000 b/cd.
29. USA Petrochem Co., Ventura, Calif.—27,900 b/cd.

Legend

Numbers identify processes in table

THERMAL PROCESSES
1. Gas-oil cracking
2. Thermal cracking
3. Visbreaking
4. Coking (fluid)
5. Coking (delayed)
6. Other

CAT CRACKING
1. Fluid
2. Other

CAT REFORMING
Semiregenerative:
  1. Conventional catalyst
  2. Bimetallic catalyst
Cyclic:
  3. Conventional catalyst
  4. Bimetallic catalyst
Other:
  5. Conventional catalyst
  6. Bimetallic catalyst

CAT HYDROCRACKING
1. Distillate upgrading
2. Residual upgrading
3. Lube-oil manufacturing
4. Other

CAT HYDROREFINING
1. Residual desulfurizing
2. Heavy gas-oil desulfurizing
3. Cat-cracker and cycle-stock feed pretreatment
4. Middle distillate
5. Other

CAT HYDROTREATING
1. Pretreating cat-reformer feeds
2. Naphtha desulfurizing
3. Naphtha olefin or aromatics saturation
4. Straight-run distillate
5. Other distillate
6. Lube-oil "polishing"
7. Other

ALKYLATION
1. Sulfuric acid
2. Hydrofluoric acid

AROMATICS/ISOMERIZATION
1. BTX
2. Hydrodealkylation
3. Cyclohexane
4. C_4 feed
5. C_5 feed
6. C_5 and C_6 feed

HYDROGEN
1. Steam methane reforming
2. Steam naphtha reforming
3. Partial oxidation
4. Cryogenic
5. Other

NR—not reported

Survey of operating refineries in the U.S. (state capacities as of January 1, 1985)

State	No. plants	Crude capacity		Charge capacity, b/sd								Production capacity, b/sd					
				Vacuum distillation	Thermal operations	Cat cracking		Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alkylation	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
		b/cd	b/sd			Fresh feed	Recycle										
Alabama	1	80,000	81,300	20,000	......	......	......	21,000	......	27,000	21,000	......	......	......	......	......	......
Alaska	4	138,930	142,910	6,000	......	......	......	12,000	7,500	......	12,000	......	......	......	8,300	......	......
Arizona	1	5,000	5,263	1,500	......	......	......	......	......	......	......	......	......	......	1,000	......	......
Arkansas	4	69,170	70,950	31,025	......	18,500	800	9,000	......	......	20,100	4,400	......	5,200	11,000	2.8	......
California	30	2,265,098	2,381,417	1,265,900	476,100	571,500	65,100	512,350	346,200	419,000	809,980	100,700	13,700	25,400	72,350	923.4	17,720
Colorado	3	94,700	98,500	30,125	4,200	23,000	1,500	20,400	5,000	......	28,900	......	......	......	3,300	8.0	......
Delaware	1	140,000	150,000	95,000	54,000	60,000	15,000	56,000	19,000	......	110,000	8,000	3,370	......	......	40.0	2,180
Georgia	2	28,800	32,000	......	......	......	......	......	......	......	......	......	......	......	17,600	......	......
Hawaii	2	109,500	118,426	58,000	......	22,000	......	13,000	12,000	......	16,500	4,500	1,500	......	1,300	19.5	......
Illinois	8	946,000	1,003,550	378,950	103,700	374,000	45,600	298,400	66,500	33,000	493,100	71,200	7,300	5,150	39,255	36.0	6,175
Indiana	5	431,300	445,500	242,400	22,000	166,000	7,500	84,500	......	60,000	147,800	29,200	31,000	6,400	48,700	......	1,280
Kansas	7	338,000	352,383	101,500	51,000	124,500	9,000	88,600	3,190	44,500	123,400	33,700	11,445	2,500	3,200	......	2,070
Kentucky	2	218,900	226,000	90,000	57,600	100,000	30,000	46,000	......	40,000	96,300	11,000	23,500	7,900	30,000	20.0	......
Louisiana	16	2,188,793	2,280,958	854,300	381,900	765,400	42,800	462,000	136,700	285,500	817,600	173,200	34,054	35,900	55,900	172.0	13,573
Maryland	1	14,200	14,947	14,300	......	......	......	......	......	......	......	......	......	......	11,300	......	......
Michigan	4	119,400	126,094	26,000	......	45,000	1,300	33,000	......	12,500	36,700	7,500	......	......	8,650	......	......
Minnesota	2	204,143	211,220	132,000	48,000	78,000	1,000	39,000	......	66,500	114,200	14,400	8,000	......	49,000	20.0	2,500
Mississippi	5	362,400	383,104	282,000	70,000	74,000	2,000	95,800	68,000	189,000	59,800	19,700	5,500	......	36,600	195.0	3,450
Montana	6	147,500	154,147	55,250	9,900	50,600	7,500	41,000	4,900	14,000	103,400	9,900	5,200	......	16,000	19.3	425
Nevada	1	4,500	4,700	2,500	......	......	......	......	......	......	......	......	......	......	......	......	......
New Jersey	5	503,000	533,210	285,400	34,500	229,000	45,000	125,500	......	125,000	309,500	16,000	25,000	8,500	88,000	11.0	975
New Mexico	3	63,050	66,000	13,900	......	27,100	5,600	17,300	......	......	29,600	3,200	......	......	3,900	......	......
North Dakota	2	62,800	65,400	......	1,000	26,000	5,200	12,000	......	1,200	16,200	3,000	4,500	......	......	......	......
Ohio	5	515,700	540,000	174,000	27,400	185,700	33,800	159,700	81,000	23,000	167,500	31,300	10,900	2,100	19,000	72.0	1,250
Oklahoma	5	374,000	390,394	131,500	30,300	133,500	25,900	97,000	5,000	26,000	123,000	32,600	12,500	9,800	19,300	10.0	1,040
Oregon	1	15,000	15,789	16,000	......	......	......	......	......	......	......	......	......	......	11,500	......	......
Pennsylvania	8	658,700	691,300	306,850	......	242,300	12,100	189,200	55,000	135,000	314,600	40,200	11,200	21,690	25,000	48.5	......
Tennessee	1	57,000	60,000	12,000	......	30,000	12,000	8,000	......	......	28,200	3,600	......	......	3,500	......	......
Texas	33	4,145,900	4,385,273	1,801,700	348,500	1,572,500	200,350	1,046,300	204,000	777,100	2,235,450	249,675	243,615	94,944	53,066	591.0	10,717
Utah	6	154,950	161,868	45,500	8,500	54,800	10,600	25,500	......	5,500	33,100	11,400	3,750	......	1,700	......	350
Virginia	1	51,000	53,000	29,000	13,500	27,500	2,000	8,750	......	......	24,500	......	......	......	......	......	825
Washington	7	410,550	427,543	201,754	59,000	91,500	23,000	103,800	49,000	25,000	160,500	24,600	2,900	......	19,000	79.0	2,980
West Virginia	2	16,500	17,000	8,175	......	......	......	4,400	......	......	4,800	......	......	5,000	......	1.2	......
Wisconsin	1	39,000	40,000	20,500	......	9,700	1,000	9,800	......	5,800	9,800	1,600	......	......	13,500	......	......
Wyoming	6	162,778	168,052	72,452	9,000	63,833	9,700	32,027	......	10,000	57,488	8,250	1,500	1,830	8,700	......	550
Total	191	15,136,262	15,898,198	6,805,481	1,810,100	5,165,933	615,350	3,671,327	1,062,990	2,324,600	6,525,018	912,825	460,434	232,314	678,621	2,268.7	68,060

U.S. refineries: location, capacities, types of processing

Company and location	– Crude capacity – b/cd	b/sd	Charge capacity, b/sd: Vacuum distillation	Thermal operations	— Cat cracking — Fresh feed	Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Production capacity, b/sd: Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
ALABAMA																
Louisiana Land & Exploration Co. Saraland	80,000	81,300	20,000				21,000		15,000 [4]12,000	21,000						
Total	80,000	81,300	20,000	......	......	......	21,000	......	27,000	21,000	......	......	......	......	......	......
ALASKA																
Atlantic Richfield Co. Prudhoe Bay	22,000	22,000														
Chevron U.S.A. Inc. Kenai	22,000	NR												6,000		
Mapco Petroleum Inc. North Pole	46,430	46,700	6,000											2,300		
Tesoro Petroleum Corp. Kenai	48,500	51,053					12,000	7,500		[1]12,000						
Total	138,930	142,910	6,000	......	......	......	12,000	7,500	......	12,000	......	......	......	8,300	......	......
ARIZONA																
Intermountain Refining Cl. Fredonia	5,000	NR	1,500											1,000		
Total	5,000	5,263	1,500	......	......	......	......	......	......	......	......	......	......	1,000	......	......
ARKANSAS																
Berry Petroleum, subsidiary of Crystal Oil Co. Stevens	3,500	4,000	1,925											1,000		
Cross Oil & Refining Co. of Arkansas Smackover	9,800	9,950	3,600							[6]2,600			2,600	2,000	[1]2.8	
Macmillan Ring-Free Oil Cl. Norphlet	5,870	6,000	3,500										2,600	2,000		
Tosco Corp. El Dorado	50,000	51,000	22,000		18,500	800	9,000			[1]12,000 [5]5,500	[1]4,400			6,000		
Total	69,170	70,950	31,025	......	18,500	800	9,000	......	......	20,100	4,400	......	5,200	11,000	2.8	......
CALIFORNIA																
Anchor Refining Cl. McKittrick	10,000	11,000	7,000													
Atlantic Richfield Co. Carson	215,000	220,000	101,000	46,000	62,000	None	44,000	21,000		[1]38,000 [4]18,000 [5]5,500 16,000	[1]7,200 *2,400				60.0	2,100
Beacon Oil Co. Hanford	17,880	18,230		500 2,750			3,650			[1]5,000	*100					
Champlin Petroleum Co. Wilmington	60,000	62,500	35,000	24,000	32,000	NR	13,000		38,000	[1]13,000	10,000	7,500				1,200
Chevron U.S.A. Inc. Bakersfield	26,000	NR		9,800			6,000			[1]6,000						
El Segundo	405,000	NR	179,000	54,000	60,000	None	60,000	43,000	24,000 60,000 [4]14,000	56,000 [4]18,000	[1]8,000	[1]1,500			112.0 [4]55.0	2,900
Richmond	365,000	NR	226,000		63,000	None	84,000	77,500 30,000	60,000 [4]65,000	82,000 [5]18,200	[1]9,200	[4]2,000	11,700	11,000	135.0	
Conoco Inc. Santa Maria	9,500	10,000	7,800											6,800		
Edgington Oil Cl. Long Beach	35,000	37,000	20,800											15,500		
Exxon Co. Benicia	109,000	114,000	61,000	[4]27,500	57,000	11,000	[4]28,000	28,000	33,000	22,500 20,000 [4]12,500 [5]12,500 11,500	11,500				104.0	1,100

Company and location	Crude capacity b/cd	Crude capacity b/sd	Vacuum distillation	Thermal operations	Charge capacity, b/sd — Cat cracking — Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Production capacity, b/sd — Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Fletcher Oil & Refining Co., Carson	29,500	30,500			10,000	1,000	4,200		10,000	4,200						
Golden Bear Division, Witco Chemical Corp., Oildale	10,818	11,500	11,500							780			4,800	3,300		
Golden West Refining Co., Santa Fe Springs	40,600	42,300	25,000	13,800	13,500	None	19,000	11,000		12,000	3,000			4,000	11.0	
Huntway Refining Co., Benicia	8,400	9,000	7,500											5,500		
Wilmington	5,500	6,000	5,000											3,500		
Kern County Refinery Inc., Bakersfield	21,400	23,000		7,000			3,000			3,000						
Macmillan Ring-Free Oil Cl., Signal Hill	13,000	14,300														
Mobil Oil Corp., Torrance	123,500	130,000	95,000	48,000	61,000	None	36,000	21,700		21,000 16,000 28,000	12,300				62.0	2,900
Newhall Refining Cl., Newhall	21,400	23,000	9,000				2,300		5,000	3,000				4,500		
Oxnard Refinery, Oxnard	4,700	5,000												2,250		
Pacific Refining Co., Hercules	55,000	NR	15,000	12,000			15,000	3,000		15,000						
Sabre Refining Inc., Bakersfield	9,500	10,000														
San Joaquin Refining Cl., Bakersfield	12,000	20,000	12,000	9,000										5,000		
Shell Oil Co., Martinez	91,400	94,000	67,300	22,000	60,000	NR	23,000	20,000	50,000	17,000 15,000 16,000 6,300 12,000	8,000 *3,200		4,500	11,000	106.0	20
Wilmington	108,000	113,000	60,000	52,000	35,000	NR	24,000			27,000 12,000 34,000 25,000	8,600	2,700			36.0	2,500
Texaco Refining & Marketing Inc.																
Bakersfield	38,000	42,000	22,000				6,500		15,000	6,500						
Wilmington	75,000	78,400	42,000	48,000	28,000	8,000	35,000	20,000		18,000	4,400				48.0	1,650
Tosco Corp., Martinez	126,000	132,600	105,000	37,000	45,000	None	8,700 20,000	20,000	45,000	10,000 24,500	10,500				75.0	1,200
Union Oil Co. of California, Los Angeles	108,000	111,000	83,000	20,000	45,000	7,000	49,000	21,000		52,000 33,000	8,000				49.4	......
Rodeo	111,000	117,300	69,000	45,500			28,000	30,000		21,000 9,000 14,000			4,400		70.0	2,150
Total	**2,265,098**	**2,381,417**	**1,265,900**	**476,100**	**571,500**	**65,100**	**512,350**	**346,200**	**419,000**	**809,980**	**100,700**	**13,700**	**25,400**	**72,350**	**923.4**	**17,720**

Solvent extraction: 50,000 b/sd.

COLORADO

Company and location	Crude capacity b/cd	Crude capacity b/sd	Vacuum distillation	Thermal operations	Cat cracking Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Asamera Oil U.S. Inc., Commerce City	NR	40,000	15,000		8,000	500	10,000			10,000	*1,600					
Conoco Inc., Commerce City	41,500	42,500	7,000		15,000	1,000	7,000			7,000 8,500	*4,500			3,300		
Gary Refining Co., Fruita	15,200	16,000	8,125	4,200			3,400	5,000		3,400					8.0	
Total	**94,700**	**98,500**	**30,125**	**4,200**	**23,000**	**1,500**	**20,400**	**5,000**	......	**28,900**	......	......	......	**3,300**	**8.0**	......

DELAWARE

Company and location	Crude capacity b/cd	Crude capacity b/sd	Vacuum distillation	Thermal operations	Cat cracking Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Texaco Refining and Marketing Inc., Delaware City	140,000	150,000	95,000	54,000	60,000	15,000	21,000 35,000	19,000		55,000 55,000	8,000 *5,500	2,900 470			40.0	2,180
Total	**140,000**	**150,000**	**95,000**	**54,000**	**60,000**	**15,000**	**56,000**	**19,000**	......	**110,000**	**8,000**	**3,370**	......	......	**40.0**	**2,180**

Company and location	Crude capacity		Charge capacity, b sd								Production capacity, b sd				Hydrogen (MMcfd)	Coke (t d)
	b cd	b sd	Vacuum distillation	Thermal operations	Cat cracking Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt		
GEORGIA																
Amoco Oil Co. Savannah	24,000	27,000												15,000		
Young Refining Corp. Douglasville	4,800	5,000												2,600		
Total	**28,800**	**32,000**	......	......	......	......	......	......	......	......	......	......	......	**17,600**	......	......
HAWAII																
Chevron U.S.A. Inc. Barber's Point	48,000	NR	28,000		22,000	None				3,500	4,500	1,500		1,300	2.5	
Hawaiian Independent Refinery Inc. Ewa Beach	61,500	67,900	30,000				13,000	12,000		13,000					17.0	
Total	**109,500**	**118,426**	**58,000**	......	**22,000**	......	**13,000**	**12,000**	......	**16,500**	**4,500**	**1,500**	......	**1,300**	**19.5**	......
ILLINOIS																
Calumet Industries Inc. Burnham	500	550	550										550			
Clark Oil & Refining Corp. Blue Island	57,000	60,000	27,000		25,000	1,000	30,500	11,000		20,500	6,000			4,500		
Hartford	47,500	50,000	18,000	12,500	27,000	1,000	12,000			12,000 10,000	8,000					750
Marathon Oil Co. Robinson	195,000	205,000	62,000	4,000 24,000	38,000	400	12,400 35,000 30,000	22,000	6,000	22,000	7,600				25.0	1,200
Mobil Oil Corp. Joliet	180,000	200,000	88,000	35,000	98,000	None	46,000			72,000 9,000 5,000	24,000					2,225
Shell Oil Co. Wood River	250,000	261,000	105,500		94,000	NR	22,000 68,000	33,500	27,000	64,000 52,500 7,000 35,000	22,000	3,800	4,600	28,500		
Texaco Refining & Marketing Inc. Lawrenceville	65,000	70,000	18,000		34,000	10,000	12,000			12,000 5,000	3,600 *2,500			2,700		
Union Oil Co. of California Lemont	151,000	157,000	59,900	28,200	58,000	5,000	30,500			30,500 13,500 8,000 39,000 1,800 4,300		3,500		3,555	11.0	2,000
Total	**946,000**	**1,003,550**	**378,950**	**103,700**	**374,000**	**45,600**	**298,400**	**66,500**	**33,000**	**493,100**	**71,200**	**7,300**	**5,150**	**39,255**	**36.0**	**6,175**
INDIANA																
Amoco Oil Co. Whiting	350,000	360,000	203,000	22,000	140,000	7,000	73,000		60,000	85,000 42,000 4,300	23,000	13,000 18,000	6,400	40,000		1,280
Gladieux Refinery Inc. Ft. Wayne	18,600	20,000	9,500											3,700		
Indiana Farm Bureau Cooperative Association Inc. Mt. Vernon	20,600	21,500	7,200		7,000	NR	3,500			3,500	1,700					
Laketon Refining Corp. Laketon	10,000	11,000	7,700											5,000		
Rock Island Refining Corp. Indianapolis	32,100	33,000	15,000		19,000	500	8,000			13,000	4,500					
Total	**431,300**	**445,500**	**242,400**	**22,000**	**166,000**	**7,500**	**84,500**	......	**60,000**	**147,800**	**29,200**	**31,000**	**6,400**	**48,700**	......	**1,280**

Solvent extraction 4,500

Company and location	– Crude capacity – b/cd	b/sd	Vacuum distillation	Thermal operations	— Cat cracking — Fresh feed	Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
			Charge capacity, b/sd								Production capacity, b/sd					
KANSAS																
Derby Refining Co.—Wichita	28,800	30,000	10,000	[5]5,000	[1]17,000	2,500	[2]7,000	......	......	[1]7,000	[1]3,000 *1,500	......	......	......	......	210
Farmland Industries Inc.—Coffeyville	56,500	60,723	19,500	[5]12,000	[1]23,000	1,500	[2]16,000	......	[4]4,500	[1]19,800	[2]6,000	......	2,500	......	......	600
Phillipsburg	26,400	27,460	10,000	......	......	......	[1]5,300	......	......	[1]7,500	......	......	......	2,000	......	......
National Cooperative Refinery Association—McPherson	70,000	73,000	18,000	[5]22,000	[1]20,000	1,000	[2]14,000	......	......	[1]14,000 [5]13,000 [7]8,000	[2]6,000	[4]2,000 [6]8,000	......	......	......	650
Pester Refining Co.—El Dorado[1]	31,000	32,000	10,000	......	[1]14,500	None	[2]5,000	......	......	[1]5,500	[2]3,200	......	......	......	......	......
Texaco Refining & Marketing Inc.—El Dorado	80,000	82,000	27,000	[5]12,000	[1]32,000	4,000	[2]25,000	......	[1]40,000	[1]28,000 [2]4,300	[2]10,000	[1]1,445	......	......	......	610
Total Petroleum Inc.—Arkansas City	45,300	47,200	7,000	......	[1]18,000	None	[2]16,300	[1]3,190	......	[1]16,300	[2]5,500	......	......	1,200	......	......
Total	**338,000**	**352,383**	**101,500**	**51,000**	**124,500**	**9,000**	**88,600**	**3,190**	**44,500**	**123,400**	**33,700**	**11,445**	**2,500**	**3,200**	......	**2,070**

Solvent extraction: [1]5,200 b/sd

Company and location	– Crude capacity – b/cd	b/sd	Vacuum distillation	Thermal operations	— Cat cracking — Fresh feed	Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
KENTUCKY																
Ashland Petroleum Co.—Catlettsburg[1]	213,400	220,000	90,000	[2]2,600 †[5]55,000	[1]60,000 §40,000	NR	[2]18,000 [6]27,000	......	[1]40,000	[1]45,000 [2]4,000 [3]6,000 [4]40,000	[2]11,000 *2,000	[1]4,000 [2]2,500 [4]5,000 [6]12,000	7,900	30,000	[1]20.0	......
Somerset Refinery Inc.—Somerset	5,500	6,000	......		......	......	[2]1,000	......	......	[1]1,300	......	......	......	......	......	......
Total	**218,900**	**226,000**	**90,000**	**57,600**	**100,000**	**30,000**	**46,000**	......	**40,000**	**96,300**	**11,000**	**23,500**	**7,900**	**30,000**	**20.0**	......

Solvent extraction: [1]10,000 b/sd †ART §Reduced crude converter

Company and location	– Crude capacity – b/cd	b/sd	Vacuum distillation	Thermal operations	— Cat cracking — Fresh feed	Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
LOUISIANA																
Atlas Processing Co., Division of Pennzoil—Shreveport[1]	46,200	50,000	24,300		......		[2]10,000	......	......	[1]10,000 [6]3,400 [7]1,200 [7]5,500	......	......	8,500	600	[1]6.1	......
Calcasieu Refining Co.—Lake Charles	12,500	13,000	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Calumet Refining Co.—Princeton	4,200	4,400	3,000	......	......	......	......	......	......	......	......	......	3,000	1,400	......	......
Canal Refining Co.—Church Point	7,858	7,858	......	......	......	......	[1]1,600	......	......	......	......	......	......	......	......	......
Citgo Petroleum Corp.—Lake Charles	320,000	330,000	83,000	[5]63,000	[1]150,000	None	[2]46,000 [5]45,000	[1]30,000	[4]40,000	[1]91,000 [4]14,000	[1]33,000	[1]2,300	7,000	......	......	3,000
Claiborne Gasoline Co.—Lisbon	NR	7,500	......	......	......	......	[2]2,000	......	......	......	......	[6]1,500	......	......	......	......
Conoco Inc.—Lake Charles	156,500	164,000	63,000	[2]10,600 [5]48,800	[1]30,600	None	[2]15,000 [5]12,400	......	[2]27,000	[1]33,000 [3]6,000 [4]45,000 [5]16,000	[1]6,000 *2,100	......	......	......	[1]28.4	3,160
Cotton Valley Refinery (Kerr-McGee Refining Corp.)—Cotton Valley	NR	7,800	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Exxon Co.—Baton Rouge[1]	455,000	474,000	205,000	[5]76,000	[1]155,000	None	[4]95,000	[1]24,000	......	[1]95,000 [3]2,500 [5]55,000 [6]17,000 [7]2,000	[1]29,800 *8,000	......	17,400	28,900	......	4,003
Gulf Products Co.—Belle Chasse	198,500	205,000	73,000	[5]21,000	[1]89,000	2,300	[2]40,000	......	......	[2]42,000 [4]46,000	[2]28,400	[3]3,914 [4]4,240	......	......	......	860

Company and location	Crude capacity		Charge capacity, b/sd								Production capacity, b/sd					
	b/cd	b/sd	Vacuum distillation	Thermal operations	Cat cracking — Fresh feed	Cat cracking — Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Marathon Oil Co.—Garyville	255,000	263,000	125,000	......	[1]75,000	14,000	[5]50,000	......	[2]58,000 [4]35,500	[1]45,000	[2]20,000	[4]15,100	......	25,000	......	......
Murphy Oil USA Inc.—Meraux[1]	92,500	95,400	40,000	......	[1]35,300	3,000	[5]23,000	......	......	[1]29,000 [4]15,000	[2]10,500	......	......	......	......	......
Placid Refining Co.—Port Allen[4]	46,000	50,000	20,000	......	[1]18,500	1,500	[2]7,000		......	[1]7,000	[2]3,500	......	......	......	......	......
Shell Oil Co.—Norco	218,000	225,000	78,000	[1]19,500 [2]17,700 [5]85,800	[1]100,000	2,000	[3]28,000	[1]27,700	[1]70,000	[2]29,000 [3]28,000	[1]13,500 *10,000	......	......	......	[2]51.0	1,000
Tenneco Oil Co.—Chalmette	137,000	144,000	65,000	[5]27,500	[1]42,000	None	[2]28,000 [3]19,000	[1]20,000	[1]35,000 [4]20,000	[1]38,000	[2]16,000	[1]7,000			[1]24.0	1,550
Texaco Refining & Marketing Inc.—Convent	225,000	240,000	75,000	[1]12,000	[1]70,000	20,000	[2]40,000	[1]35,000	......	[1]40,000 [4]37,000 [5]65,000	[1]12,500	......			[2]62.5	
Total	**2,188,793**	**2,280,958**	**854,300**	**381,900**	**765,400**	**42,800**	**462,000**	**136,700**	**285,500**	**817,600**	**173,200**	**34,054**	**35,900**	**55,900**	**172.0**	**13,573**

Solvent extraction: [1]7,100 b/sd [2]6,900 b/sd [3]12,000 b/sd [4]5,000 b/sd

MARYLAND

Company and location	Crude capacity b/cd	b/sd	Vacuum distillation	Thermal operations	Cat cracking — Fresh feed	Cat cracking — Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Chevron U.S.A. Inc.—Baltimore	**14,200**	**14,947**	**14,300**	......	......	......	......	......	......	......	......	......	......	**11,300**	......	......

MICHIGAN

Company and location	Crude capacity b/cd	b/sd	Vacuum distillation	Thermal operations	Cat cracking — Fresh feed	Cat cracking — Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Crystal Refining Co.—Carson City	4,000	6,200														
Lakeside Refining Co.—Kalamazoo	5,600	NR					[1]2,000									
Marathon Oil Co.—Detroit	68,500	71,000	26,000		[1]27,000	1,300	[1]17,000		[1]12,500	[1]17,500	[1]4,000			8,650		
Total Petroleum Inc.—Alma	41,300	43,000			[1]18,000	None	[1]14,000			[1]14,000 [4]1,400 3,800	[2]3,500 †1,000					
Total	**119,400**	**126,094**	**26,000**		**45,000**	**1,300**	**33,000**		**12,500**	**36,700**	**7,500**	......	......	**8,650**	......	......

†Dimersol

MINNESOTA

Company and location	Crude capacity b/cd	b/sd	Vacuum distillation	Thermal operations	Cat cracking — Fresh feed	Cat cracking — Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Ashland Petroleum Co.—St. Paul Park	67,143	69,220	32,000		23,000	NR	13,000		[1]23,000	[1]13,000 [4]7,200 8,000	5,900 *350	8,000		14,000		
Koch Refining Co.—Rosemount	137,000	142,000	100,000	48,000	[1]55,000	1,000	26,000		[1]43,500	[1]26,000 [4]46,000 14,000	[1]8,500 *1,100 †3,700			35,000	20.0	2,500
Total	**204,143**	**211,220**	**132,000**	**48,000**	**78,000**	**1,000**	**39,000**	......	**66,500**	**114,200**	**14,400**	**8,000**	......	**49,000**	**20.0**	**2,500**

†Dimersol

MISSISSIPPI

Company and location	Crude capacity b/cd	b/sd	Vacuum distillation	Thermal operations	Cat cracking — Fresh feed	Cat cracking — Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Amerada-Hess Corp.—Purvis	30,000	NR	20,000	[3]8,000	[1]18,000	NR	5,800			5,800 [4]6,000	[1]3,500					250
Chevron U.S.A. Inc.—Pascagoula	295,000	NR	243,000	62,000	[1]56,000	2,000	90,000	68,000	[1]96,000 [3]63,000 [4]30,000	[1]48,000	[1]16,200	5,500		20,000	[1]195.0	3,200
Ergon Refining Inc.—Vicksburg	20,600	22,000	12,000											8,000		

Company and location	Crude capacity		Charge capacity, b/sd								Production capacity, b/sd				Hydrogen (MMcfd)	Coke (t/d)
	b/cd	b/sd	Vacuum distillation	Thermal operations	Cat cracking Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt		
Southland Oil Co Lumberton	5,800	6,500												3,500		
Sandersville	11,000	12,500	7,000											5,100		
Total	**362,400**	**383,104**	**282,000**	**70,000**	**74,000**	**2,000**	**95,800**	**68,000**	**189,000**	**59,800**	**19,700**	**5,500**	......	**36,600**	**195.0**	**3,450**
MONTANA																
Cenex Laurel[1]	40,400	42,500	14,000	......	12,000	3,000	12,000	......	[4]14,000	15,000	3,000	[4]2,000	......	6,000	......	......
Conoco Inc Billings	48,500	50,000	20,000	......	15,500	1,000	15,800		......	[4]38,000 3,500	4,200	[4]3,200	......	6,000	......	
Exxon Co Billings	42,000	44,000	18,000	[4]7,500	21,000	3,500	10,000	4,900		15,500 [4]10,000 10,000 6,000	2,700	......	......	3,000	19.3	425
Flying J Inc Cut Bank	5,600	6,200	—	2,400			2,200			2,200 [4]1,000	*500					
Kenco Refining Inc Wolf Point	4,700	NR		......							......					
Montana Refining Co Great Falls	6,300	6,500	3,250		2,100		1,000			1,000 [4]1,200	*270			1,000	—	
Total	**147,500**	**154,147**	**55,250**	**9,900**	**50,600**	**7,500**	**41,000**	**4,900**	**14,000**	**103,400**	**9,900**	**5,200**	......	**16,000**	**19.3**	**425**

Solvent extraction [1]4,000 b/sd

Company and location	Crude b/cd	Crude b/sd	Vacuum distillation	Thermal operations	Cat cracking Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
NEVADA																
Nevada Refining Co Tonopah	4,500	4,700	2,500	......	......	......	......	......	......	......	......	......	......	......	......	......
NEW JERSEY																
Chevron U.S.A. Inc Perth Amboy	168,000	NR	96,000	......	33,000	8,000	39,000	......	60,000	39,000 [4]20,000	3,000	......	......	50,000	......	......
Exxon Co Linden	100,000	110,000	66,000	......	120,000	25,000	[4]25,000	......	50,000	28,000 19,000 65,000	8,500	25,000	......	38,000	......	......
Mobil Oil Corp Paulsboro	100,000	104,000	62,400	21,500	36,000	None	23,500	......	15,000	23,500 42,000	1,500	......	8,500	......	11.0	975
Seaview Petroleum Inc Thorofare	45,000	NR	30,000					......	......	......	......	......	......	......	......	......
Texaco Refining & Marketing Inc Westville	90,000	95,000	31,000	13,000	40,000	12,000	38,000	......	......	43,000 [4]30,000	3,000 *2,500	......	......	......	......	......
Total	**503,000**	**533,210**	**285,400**	**34,500**	**229,000**	**45,000**	**125,500**	......	**125,000**	**309,500**	**16,000**	**25,000**	**8,500**	**88,000**	**11.0**	**975**
NEW MEXICO																
Bloomfield Refining Co Bloomfield	13,700	14,000	......		5,400	500	2,800	......	......	2,800	......					
Giant Industries Inc Gallup	18,000	19,000	7,900		7,200	3,600	6,800			6,800	1,400			400		
Navajo Refining Co Artesia	NR	33,000	6,000		14 500	1,500	1,700 6,000			10,000 [4]3,500 6,500	1,800			3,500		
Total	**63,050**	**66,000**	**13,900**	......	**27,100**	**5,600**	**17,300**	......	......	**23,600**	**3,200**	......	......	**3,900**	......	......
NORTH DAKOTA																
Amoco Oil Co Mandan	58,000	60,000			26,000	5,200	[4]10,000			15,000	3,000	4,000				

Company and location	Crude capacity b cd	Crude capacity b sd	Vacuum distillation	Thermal operations	Charge capacity, b sd: Cat cracking Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Production capacity, b sd: Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t d)
Flying J Inc Williston	4,800	5,400		1,000			2,000		[3]1,200	[1]1,200	*1,700	500				
Total	62,800	65,400	......	1,000	26,000	5,200	12,000	......	1,200	16,200	3,000	4,500	......	......	......	......
OHIO																
Ashland Petroleum Co Canton	66,000	68,000	33,000		25,000	NR	20,000		23,000	20,000 [3]7,000	7,000 *500			12,000		
Gulf Oil Products Co Cincinnati	43,700	45,000			18,000	2,000	11,000			11,000 [4]6,000	6,000					
Standard Oil Co. of Ohio Lima	168,000	177,000	51,000	16,200	37,700	7,800	47,000	[3]20,000		59,000			2,100			620
Toledo	120,000	126,000	68,000	11,200	55,000	16,500	40,700	35,000		37,000	11,300			7,000	24.0	630
Sun Cl-Toledo	118,000	124,000	22,000		50,000	7,500	41,000	26,000		27,500	7,000	8,500 2,400			48.0	
Total	515,700	540,000	174,000	27,400	185,700	33,800	159,700	81,000	23,000	167,500	31,300	10,900	2,100	19,000	72.0	1,250
Solvent extraction 11,000 b sd																
OKLAHOMA																
Conoco Inc Ponca City	134,000	138,000	40,000	23,000	45,000	NR	33,500			33,500 9,000	9,700 *1,700	[3]5,000	2,000			740
Kerr-McGee Refining Corp Wynnewood	43,000	NR	13,000		20,000	NR	8,500	5,000	6,000	9,000	5,000			5,000	10.0	
Sinclair Oil Corp Tulsa	50,000	NR	15,000		18,000	5,000	20,000			20,000 [3]5,000	3,000 *1,600	[3]500		2,500		
Sun Cl Tulsa	85,000	90,000	31,500	7,300	28,000	1,400	23,000			24,000 10,500	2,400 6,000	2,000 1,200 1,500 2,300	7,800	4,800		300
Total Petroleum Inc Ardmore	62,000	64,500	32,000		22,500	None	12,000		20,000	12,000	6,500			6,500		
Total	374,000	390,394	131,500	30,300	133,500	25,900	97,000	5,000	26,000	123,000	32,600	12,500	9,800	18,300	10.0	1,040
Solvent extraction 5,000 b sd 5,900 b sd																
OREGON																
Chevron U S A Inc Portland	15,000	15,789	16,000	......	......	......	......	......	......	......	......	......	......	11,500	......	......
PENNSYLVANIA																
Atlantic Richfield Co Philadelphia	125,000	130,000	83,000		29,000	None	60,000	30,000	24,000 [3]50,000	54,000				25,000	45.0	
BP Oil Corp Marcus Hook	168,000	177,000	85,000		48,000	1,600	50,000	[3]25,000	48,000	64,000 [3]20,000	8,200	600				
Gulf Oil Products Co Philadelphia	174,100	180,000	80,000		85,300	6,500	34,000			21,000 34,000 [3]30,000	20,000	4,000 1,300				
Kendall-Amalie Division,																
Witco Chemical Co Bradford	7,600	9,000								2,300			3,040			
Pennzoil Products Co Rouseville	15,700	16,500	6,500				3,600			4,500 7,800			4,750		3.5	
Quaker State Oil Refining Corp																
Farmers Valley	6,500	6,800	2,750				2,000			2,300			2,000			
Sun Cl Marcus Hook	155,000	165,000	46,000	...	80,000	4,000	10,800 28,800		13,000	54,300 [4]14,400 6,000	12,000	5,300	10,500			

	Crude capacity		Charge capacity, b/sd								Production capacity, b/sd					
Company and location	b/cd	b/sd	Vacuum distillation	Thermal operations	Cat cracking Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Valvoline Oil Co., Division of Ashland Oil Co., Freedom	6,800	7,000	3,600	......	......	......	......	......	......	......	......	......	1,400	......	......	......
Total	**658,700**	**691,300**	**306,850**	......	**242,300**	**12,100**	**189,200**	**55,000**	**135,000**	**314,600**	**40,200**	**11,200**	**21,690**	**25,000**	**48.5**	......

Solvent extraction [1]16,000 b/sd

TENNESSEE

Company and location	Crude b/cd	Crude b/sd	Vacuum distillation	Thermal operations	Cat cracking Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Mapco Petroleum Inc., Memphis	NR	60,000	12,000	......	[1]30,000	12,000	[1]8,000	......	......	[1]8,000 [2]4,200 [5]16,000	[1]3,600 *2,500	......	......	3,500	......	......
Total	**57,000**	**60,000**	**12,000**	......	**30,000**	**12,000**	**8,000**	......	......	**28,200**	**3,600**	......	......	**3,500**	......	......

TEXAS

Company and location	Crude b/cd	Crude b/sd	Vacuum distillation	Thermal operations	Cat cracking Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydrocracking	Cat hydrorefining	Cat hydrotreating	Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Amber Refining Co., Fort Worth	14,500	15,000	3,500	......	[1]5,000	2,600	[1]1,700 [2]3,800	......	......	[1]6,400	*600	......	......	......	......	......
American Petrofina Inc., Port Arthur	90,000	110,000	40,000	[1]13,000	[1]34,000	2,000	[1]20,000	......	[4]37,000	[1]25,000	[1]2,800	[1]2,300 [2]1,600	......	......	......	......
Amoco Oil Co., Texas City	415,000	432,000	195,000	[3]37,000	[1]194,000	43,000	[4]152,000	[1]53,000 [2]60,000	[3]58,000	[1]152,000 [5]53,000	[1]23,000	[1]45,000	......	......	[1]180.0	2,000
Atlantic Richfield Co., Houston	260,000	266,000	130,000	[3]39,000	[1]78,000	None	[1]68,000	......	[3]46,000 [4]89,000	[1]68,000 [2]9,000 [3]37,000 [6]6,000 [7]600	[1]9,000	[1]11,600	6,400	......		2,400
Champlin Petroleum Co., Corpus Christi[1]	170,000	175,000	77,000	[3]25,000	[1]69,000	NR	[1]50,000	......	[3]58,000 [4]32,000	[1]52,000	[1]17,600 *1,600	[1]2,500 [4]1,500	......	......	......	1,250
Charter International Oil Co., Houston[1]	NR	70,000	27,000	[3]7,500	[1]50,000	NR	[1]13,500	......		[1]15,000 [4]22,500 [7]7,500	[1]5,000	[1]2,100	......	5,000		......
Chevron U.S.A. Inc., El Paso	76,000	NR	54,000	......	[1]22,000	None	[1]25,000	......	[4]18,000	[1]25,000	[1]5,500	[4]3,000	......	5,500		......
Coastal States Petroleum Co., Corpus Christi	95,000	NR	53,000	[1]13,500 [3]12,000	[1]19,500	1,100	[1]20,000	[1]10,000	......	[1]25,000 [4]20,000 [7]25,000	[1]2,800	[1]11,000 [2]7,000	......		[4]15.0	650
Cosden Oil & Chemical (subsidiary of American Petrofina), Big Spring	NR	60,000	22,000	[3]3,500	[1]23,500	None	[1]20,000	......	......	[1]22,000 [4]14,500 [5]3,000	[1]6,000	......		6,500		......
Crown Central Petroleum Corp., Houston	100,000	103,000	38,000	[4]12,500	[1]56,000	NR	[1]14,000 [2]22,000	......	[4]10,000	[1]26,000 [5]7,000	[1]10,000	[1]2,000 [2]2,000		......		350
Diamond Shamrock Corp., Sunray[3]	75,000	80,000	47,000		[1]45,000	None	[1]16,000		......	[1]18,000	[1]8,700 *4,600	[4]1,400		2,500		......
Three Rivers[3]	47,000	49,500	20,000	......	[1]17,000	None	[1]8,000			[1]9,000	[1]6,000		1,000	......	......	......
Exxon Co. U.S.A., Baytown[1]	494,000	525,000	208,000		[1]155,000	15,000	[4]123,000	[1]19,000	[1]71,000 [4]85,000	[1]139,000 [3]23,500 [4]143,000 [5]40,000 [6]44,100	[1]29,000	......	36,300	7,000	[1]85.0	......
Gulf Oil Products, Port Arthur[1]	406,900	418,000	203,200	[3]34,000	[1]110,000	6,000	[1]23,000 [4]44,100		......	[1]67,100 [4]138,000 [6]13,900	[1]16,900	[1]4,595 [2]2,905 [3]2,500 [5]7,200	13,200			1,840
Howell Hydrocarbons Inc., San Antonio	9,600	10,100	......			......	[1]1,200		......	......	......				......	......
Koch Refining Co., Corpus Christi	125,000	130,000	38,000	[1]12,000	[1]29,500	800	[1]13,000 [1]15,000		[4]5,000	[1]28,500	[1]6,000	[1]7,600 [2]2,500				375

Company and location	Crude capacity – b/cd	Crude capacity – b/sd	Vacuum distillation	Thermal operations	Charge capacity, b/sd — Cat cracking — Fresh feed	Cat cracking — Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Production capacity, b/sd — Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
LaGloria Oil & Gas Co.—Tyler	65,000	70,000	16,000	[6]8,000	[1]17,000	850	[2]7,000 [6]11,700	......	......	[2]20,800	[1]4,800	......	......	......	......	300
Liquid Energy Corp.—Bridgeport	10,000	10,800	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Marathon Petroleum Co.—Texas City	69,500	72,000	28,000	......	[1]38,000	1,000	[1]8,000	......	......	......	[2]11,000	[1]2,500	......	......	......	......
Mobil Oil Corp.—Beaumont	270,000	285,000	86,000	[5]29,500	[1]102,000	None	[2]103,000	[1]32,000	......	[1]92,000 [5]116,000 [6]3,500 [7]2,150	[1]13,000	[5]20,000	8,300	......	[1]60.0	1,352
Phillips Petroleum Co.—Borger	100,000	105,000	......	......	[1]60,000	10,400	[1]7,000 [2]19,000	......	[1]50,000	[1]26,500 [4]27,400 [5]12,600	[2]16,800	[3]3,060 [4]8,100 [5]12,100 [6]12,500	......	......	[1]50.0	
Sweeny	175,000	195,000	83,000	......	[1]87,000	7,700	[2]36,000	......	[1]75,000	[2]53,000 [4]50,000	[2]10,500	[1]5,575 [1]7,630 [5]9,100 [6]7,800	......	......	[4]80.0	
Pride Refining Inc.—Abilene	42,750	45,000	12,000	......	......	......	......	......	......	......	......	......	......	......	......	
Saber Energy Inc.—Corpus Christi	NR	21,000	24,000	......	†41,500	2,000	......	......	[1]46,100	......	[2]7,700 §2,400	......	......	10,000	[1]50.0	
Shell Oil Co.—Deer Park	250,000	272,000	128,000	[1]55,000 [6]20,000	[1]60,000	10,000	[2]15,000 [3]40,000	[4]15,000	[1]50,000	[2]71,000 [3]37,000 [6]15,000 [7]135,000	[1]8,175	[1]20,800	10,000	4,900	[1]71.0	......
Odessa	30,600	33,500	10,000	......	[1]10,500	5,500	[1]11,000	......	......	[2]11,000	[2]3,000	[1]350	......	......	......	
Southwestern Refining Cl—Corpus Christi	104,000	NR	36,000	......	[1]50,000	None	[2]30,000	......	[2]18,000	[1][2]40,000 [4]27,000	[2]4,000 *6,000	[1]6,500	......	......	......	......
Texaco Refining & Marketing Inc.—Amarillo	20,000	21,000	......	[6]4,000	[1]8,000	2,400	[2]5,000	......	......	[1]5,000	[1]1,500 *400	......	......	......	......	100
El Paso	17,000	18,000	......	[6]4,000	[1]7,000	2,000	[2]4,800	......	......	[1]4,800	[1]1,500 *500	[4]500	......	......	......	100
Port Arthur	200,000	215,000	100,000	......	[1]105,000	31,500	[6]40,000	[1]15,000	......	[1]40,000 [4]65,000 [6]18,500	[1]9,000	......	16,300	......	......	......
Port Neches	31,000	32,600	26,000	......	......	......	......	......	......	......	......	......	......	9,000		......
Texas City Refining Inc.—Texas City	119,600	130,000	54,000	[1]19,000	[1]40,000	None	[1]11,000 [5]12,000	......	[4]29,000	[1]23,000	[2]6,200	......	......			......
Union Oil Co. of California (Beaumont), Nederland	120,000	126,300	43,000	......	[1]39,000	4,000	[3]12,500 [4]20,000	......	......	[1]32,500 [3]10,600 [4]10,500	[1]4,200 *1,400	[1]5,000 [1]1,800	3,444	2,666	......	......
Total	**4,145,900**	**4,385,273**	**1,801,700**	**348,500**	**1,572,500**	**200,350**	**1,046,300**	**204,000**	**777,100**	**2,235,450**	**249,675**	**243,615**	**94,944**	**53,066**	**591.0**	**10,717**

Solvent extraction: [1]12,000 b/sd. [2]10,000 b/sd. [3]11,000 b/sd. [4]7,000 b/sd. [5]53,000 b/sd. [6]23,100 b/sd. [7]12,000 b/sd. †Heavy oil cracker. §Dimersol.

UTAH

Company and location	Crude capacity – b/cd	Crude capacity – b/sd	Vacuum distillation	Thermal operations	Charge capacity, b/sd — Cat cracking — Fresh feed	Cat cracking — Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Production capacity, b/sd — Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Amoco Oil Co.—Salt Lake City	40,000	41,500	......	......	[1]18,000	4,000	[4]6,000	......	......	[1]6,000	[1]4,000	[4]3,000	......	......	......	......
Chevron U.S.A.—Salt Lake City	45,000	NR	35,500	[6]8,500	[1]11,000 [2]7,000	None 1,000	[2]5,500	......	[4]5,500	[1]5,500	[2]4,300	[4]750	......	......	......	350
Crysen Refining Inc.—Woods Cross	NR	12,500	3,000	......	......	......	[1]3,000	......	......	[1]3,000	......	......	......	......	......	......
RMT Properties Inc.—Salt Lake City	25,000	26,000	3,800	......	[1]4,400	2,500	[2]5,000	......	......	[1]6,000	[2]1,000	......	......	......	......	......
Phillips Petroleum Co.—Woods Cross[1]	25,000	26,000	3,200	......	[2]8,400	2,600	[2]6,000	......	......	[2]11,000 [5]1,600	[2]2,100	......	......	1,700	......	......

Company and location	Crude capacity b/cd	Crude capacity b/sd	Vacuum distillation	Thermal operations	Charge capacity, b/sd — Cat cracking Fresh feed	Cat cracking Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Production capacity, b/sd — Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Seagull Refining Co.—Roosevelt	NR	8,500		......	6,000	500				......	*2,600	......	......	......	......	......
Total	**154,950**	**161,868**	**45,500**	**8,500**	**54,800**	**10,600**	**25,500**	......	**5,500**	**33,100**	**11,400**	**3,750**	......	**1,700**	......	**350**
Solvent extraction: [1]5,000 b/sd																
VIRGINIA																
Amoco Oil Co.—Yorktown	51,000	53,000	29,000	[1]13,500	[1]27,500	2,000	[1]8,750			[1]9,000 [1]15,500	*1,800					825
Total	**51,000**	**53,000**	**29,000**	**13,500**	**27,500**	**2,000**	**8,750**	......	......	**24,500**	......	......	......	......	......	**825**
WASHINGTON																
Atlantic Richfield Co.—Ferndale	146,000	150,000	87,000	[1]46,000	......	......	[1]46,000	[1]49,000	[4]17,000	[1]31,000	......				[1]79.0	2,200
Chevron U.S.A. Inc.—Seattle	5,500	NR	6,000	......	......	......	......			......	......	......		5,000		
Mobil Oil Corp.—Ferndale	71,500	75,000	20,000	......	[1]25,500	2,000	[1]11,800	......	......	[1]13,500 [5]15,000	[1]5,900	......		......	......	......
Shell Oil Co.—Anacortes	72,000	75,000	33,000		[1]36,000	12,000	[1]20,000		[1]8,000	[2]27,000 [5,7]21,000	[1]12,100	[4]2,900		......	......	......
Sound Refining Inc.—Tacoma	11,900	12,754	12,754	......	......	......	......	......	......	......	......		......	6,000	......	......
Texaco Refining & Marketing Inc.—Anacortes[1]	78,000	82,000	26,000	[1]13,000	[1]30,000	9,000	[1]20,000		......	[1]20,000 [4]17,000 [5]5,000	[1]6,600 *1,100	......	......	......	......	780
U.S. Oil & Refining Co.—Tacoma	NR	27,000	17,000		......	......	[1]6,000		......	[1]6,000 [4]5,000	......	......	......	8,000	......	......
Total	**410,550**	**427,543**	**201,754**	**[2]59,000**	**91,500**	**23,000**	**103,800**	**49,000**	**25,000**	**160,500**	**24,600**	**2,900**	......	**19,000**	**79.0**	**2,980**
Solvent extraction: [1]7,400 b/sd																
WEST VIRGINIA																
Quaker State Oil Refining Corp.:[1]																
Newell	11,700	12,000	6,000		......		[1]3,200	......	......	[1]3,500	......	......	3,600		[1]1.2	......
St. Mary's	4,800	5,000	2,175				[1]1,200	......	......	[1]1,300	......	......	1,400	......	......	......
Total	**16,500**	**17,000**	**8,175**	......	......	......	**4,400**	......	......	**4,800**	......	......	**5,000**	......	**1.2**	......
WISCONSIN																
Murphy Oil USA Inc.—Superior	39,000	40,000	20,500	......	[1]9,700	1,000	[1]9,800	......	[4]5,800	[1]9,800	[1]1,600	......	......	13,500	......	......
WYOMING																
Amoco Oil Co.—Casper	48,000	49,000	16,400	......	[1]13,500	2,700	[4]6,000	......	......	[1]7,100	[1]1,700	......	1,830	......	......	......
RMT Properties Inc.—Cheyenne	28,800	30,000	17,000	[4]9,000	[1]12,000	3,000	[1]1,000 [1]5,500	......	......	[1]7,500 [4]4,500	[2]2,750	[1]1,500	......	3,700	......	550
Little America Refining Co.—Casper	20,000	NR	9,052		[1]13,333	None	[4]6,777	......	......	[1]8,222 [4]4,166	*1,666	......	......	......	......	......
Mountaineer Refining Cl.—LaBarge	NR	500	......	......						......	......	......	......	......	......	......
Sinclair Oil Corp.—Sinclair	53,000	54,000	30,000		[1]21,000	1,000	[1]10,000		[1]10,000	[1]14,000 [4]12,000	[1]3,000 *750	......	......	5,000	......	......
Wyoming Refining Co.—Newcastle	12,500	13,500	......	......	[1]4,000	3,000	[1]2,750	......	......	......	[2]800	......	......	......	......	......
Total	**162,778**	**168,052**	**72,452**	**9,000**	**63,833**	**9,700**	**32,027**	......	**10,000**	**57,488**	**8,250**	**1,500**	**1,830**	**8,700**	......	**550**

OGJ-MORGAN PIPELINE COST INDEX—OIL 1ST QTR 1985

Construction costs continue 1984's moderate pace

Joseph M. Morgan
Pipeline Engineering Consultant
North Myrtle Beach, S.C.

Despite signs of recovery from a 2-year slump in the oil-pipeline construction business, competition is still dampening pipeline labor and materials costs.

The moderate pricing trends evident in 1984 continued into 1985. Smooth deliveries and modest price hikes for most materials indicate that supply and demand are closely balanced.

The composite OGJ-Morgan Pipeline Cost Index for oil-pipeline construction during the first quarter 1985 increased only 0.5 of 1% (Table 1, Fig. 1), indicating the continuation of the moderate pricing trends.

Oil pipeline activity. Planning for major oil-pipeline construction projects started on an upbeat during first quarter of 1985. In one of the biggest cross country projects, Pacific Texas Pipeline Co. arranged for supply of the balance of line pipe needed for its proposed 1,026-mile, 42-in. crude-oil line, extending from Long Beach, Calif., to Midland, Tex.

In another major project, Celeron Pipeline Co. announced plans in early 1985 to start construction around mid-year, on a 1,240-mile, 30-in. heated and insulated pipeline from Santa Barbara, Calif., to Texas.

For a while early this year, the 30-in. foreign steel line pipe for this project wasn't delivered, due to a federal import quota agreement. The U.S. Commerce Department refused to permit delivery of 320,000 tons of 30-in. pipe from two European suppliers.

In the meantime, Celeron was making arrangements to obtain additional domestic line pipe in the event that the European pipe was not released in time for mid-year construction.

Steel line pipe. The condition of the domestic steel market in first quarter 1985 was vastly improved over the previous 2 years. Orders for major pipeline projects increased the production of major domestic steelmakers.

Bethlehem Steel Corp., as a result of pipe orders from four oil and gas companies, resumed production of large diameter line pipe at the Steelton, Pa., plant late in March. The pipe plant had been idle for 6 months.

The Bethlehem plant manager stated that in 1984 foreign pipe took 71% of the U.S. large-diameter pipe market. He further said that foreign pipe producers sold their pipe at prices significantly below costs, preventing U.S. manufacturers from competing for this market.

In the meantime, steel fabrication and erection showed a slight increase in first quarter 1985. Fabrication shop prices increased slightly but were still very competitive. Steel erectors were also leaner due in large part to the liberalized work agreements with organized labor that allowed more low-cost subjourneymen on the jobsite.

The increased demand for steel line pipe influenced the domestic steel mills' pricing policies during first quarter 1985. Discounts for large-diameter line pipe were considerably less than in 1984. The net effect was a slight increase in the overall cost. Therefore, the steel line pipe index increased about 0.6%, from 218 to 219 (Table 1, Fig. 2).

Pipeline construction. Labor and machinery costs for installing steel line pipe in a ditch make up the cost component of pipeline construction. It includes such items as: clearing and grading, pipe hauling and stringing, trenching, bending, boring and tieing in road crossings, welding, X-ray testing, coating and wrapping, lowering in, backfilling, hydrostatic testing, and final cleanup.

Contractors' costs for laying steel line pipe are predicated on three major cost subcomponents:

1. Composite cost of common and skilled pipeline labor.
2. Cost of construction machinery and equipment.
3. Miscellaneous materials, fuel, insurance, taxes, etc.

Labor rates. Labor costs continued to rise very slowly during the first 3 months of 1985, despite an upturn in construction activity. Wage increases for the year seemed to be following 1984's trend toward smaller raises and more productive work practices.

Average union wages for the construction trades tracked by Engineering New-Record (ENR) rose only 0.7% during first quarter 1985.

ENR reported that hourly pay packages for common laborers climbed less than 1% in the 6 months ending in March. This left wages and fringe benefits at $15.91/hr, only 2.4% above 1984's comparable level.

Skilled labor's hourly pay leveled off even more in that 6-month period, according to ENR's 20-city figures. Since June 1984, in fact, ENR's index of skilled labor (average of carpenters, bricklayers, and structural ironworkers) remained the same, with hourly pay at $20.89. This tops last year's comparable rate by only 2.6%.

Equipment operators boosted their average hourly pay the most, but it was still a modest 3.0%.

Machinery. Construction machinery and equipment showed a slight increase of 0.2% for the first quarter 1985, according to the Bureau of Labor Statstics (BLS).

BLS further reported that equipment prices were only 1% above last year's level and almost 1% less than 1984's annual increase.

Some of the largest quarterly price increases were attributable to off-highway wheel tractors that increased 3.5%. Also off-highway wheel shovel loaders averaged 2.5% above the 1984 prices.

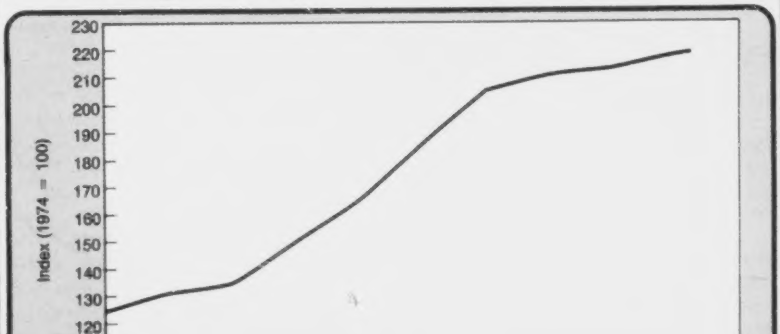
However, contractors found costs declining for several other prime equipment items in the first quarter. These included power cranes and hydraulic dozers that showed a price reduction of 0.2% and 0.5% respectively.

Miscellaneous materials. Materials furnished by the pipeline contractors including lumber, concrete, and steel, showed a range of price fluctuations from −0.53% to +0.64% during first quarter 1985.

Generally lower oil prices were helping contractors trim fuel bills for operating equipment. Diesel fuel prices declined 3.6% during first

Fig. 1

OGJ-Morgan composite oil-pipeline cost index*



*Index shown for each year is that of fiscal quarter. For indexes 1948-1974, see OGJ, May 12, 1980, pp. 128-129.

OGJ

quarter 1985 and averaged almost 8% below a year earlier.

Giving due consideration to all the price fluctuations for the three major cost subcomponents indicates that the cost of pipeline construction increased approximately 0.5% during first quarter 1985. Therefore, the index for pipeline construction increased from 219 to 220 (Table 1, Fig. 2).

Pipe coating. Coating costs recognize the various types of external coating applied to steel line pipe. Included in these applications are coal-tar products, tapes, and concrete-coated river pipe. The coatings are applied either in coating yards or over the pipeline ditch by machinery.

A review of the various components shows material cost increases of 0.75% and machinery application cost increases of 0.5%.

Weighting these two components together produces a quarterly cost increase of 0.625%. Therefore, the index for pipe coating increased from 202 to 203 for first quarter 1985 (Table 1, Fig. 2).

Pumping units. The composite cost index for large electric motors (100 hp and larger) and large centrifugal pumps increased about 0.60% during first quarter 1985.

The material components in this index increased by 0.61%, whereas the labor costs to install these units increased by 0.47% during the construction period.

Weighting these factors together produces a quarterly increase of 0.60% and a corresponding index of 286 for first quarter 1985 (Table 1, Fig. 2).

Steel storage tanks. The total cost of erecting large-diameter steel oil-storage tanks is predicated on five major subcomponents: engineering and design; material costs of carbon steel plates; shop fabrication labor; freight or shipping charges; and field erection costs.

A review of the quarterly prices for the cost components reveals the following: Engineering and design increased 0.50%; carbon steel plates, 0.67%; welders and structural ironworkers' wages, 0.75% and 0.60%, respectively; and freight costs, 0.50%.

Weighting all cost components of steel storage tanks together produces an increase of 0.60% for the first quarter 1985. Therefore, the index for steel storage tanks increased from 226 to 227 (Table 1, Fig. 2).

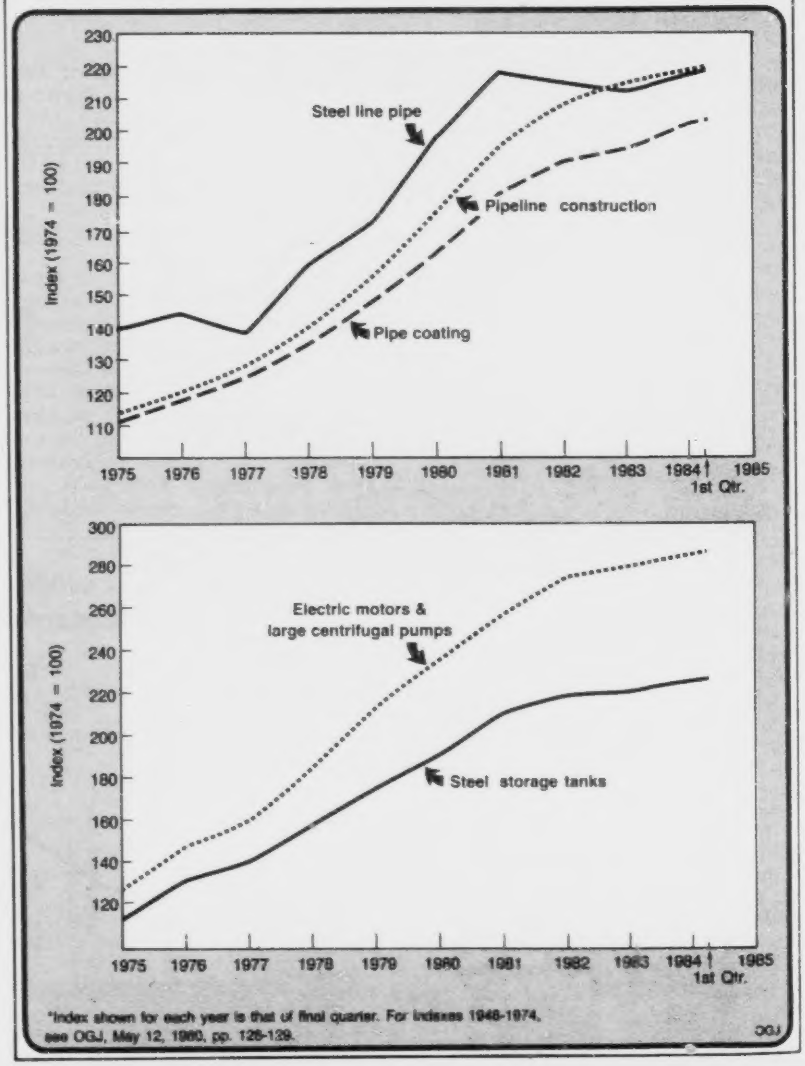
In future installments of the OG' Morgan Pipeline Cost Index—Oil series, quarterly index projections w be developed for 1985 for 18 c components of oil-pipeline constru tion. •

OGJ-Morgan oil-pipeline cost indexes (1974 = 100)

Cost component	Yeary indexes 1980	1981	1982	1983	1984	1985 1st qtr.
1 Steel line pipe	197	219	215	212	218	219
2 Line pipe fittings	193	214	209	207	213	214
3 Pipeline construction	174	195	207	214	219	220
4 Pipe coating	163	181	190	194	202	203
5 Masonry buildings	149	162	168	174	179	180
6 Metal or asbestos clad steel frame buildings	147	159	164	169	1/2	173
7 Stationary engines and reciprocating pumps	197	220	238	240	245	246
8 Electric motors—100 hp & up & large centrifugal pumps	234	256	273	278	284	286
9 Portable and miscellaneous units	194	213	227	231	233	234
10 Electric starters & switchgear	156	172	183	190	195	196
11 Shop machinery and tools	192	215	234	246	256	258
12 Oil pipe and fittings in place	184	205	208	211	216	217
13 Steel storage tanks	190	208	218	220	226	227
14 Firewalls and miscellaneous	190	208	218	220	226	227
15 Radio & microwave equipment	143	157	165	171	175	176
16 Office furniture & equipment	150	162	172	180	185	186
17 Autos, tractors, and trucks	168	183	192	201	208	210
18 Other work equipment	193	213	230	242	252	253
Total composite	**185**	**205**	**210**	**212**	**218**	**219**

Fig. 2

OGJ-Morgan oil-pipeline cost component indexes*



*Index shown for each year is that of final quarter. For indexes 1948-1974, see OGJ, May 12, 1980, pp. 128-129.

OGJ

OGJ-MORGAN PIPELINE COST INDEX—GAS
1ST QTR 1985

Construction costs continue flat, while offshore activity shows promise

Joseph M. Morgan
Pipeline Engineering Consultant
North Myrtle Beach, S.C.

Gas-pipeline construction costs began 1985 on a flat note, according to the OGJ-Morgan gas-pipeline cost index which advanced 0.51% during the first quarter (Table 1, Fig. 1). This follows a year of moderate growth and relative price stability.

As the recovery in pipeline construction entered its second year, pipeline contractors and material suppliers were benefiting from what they learned in the previous recession.

An industry-wide shakeout has eliminated many marginal producers, leaving a more efficient group of competitors. This hard-won increase in efficiency was being severely tested by a surge in low-priced imports for basic construction materials.

Producers have been aided in their ability to meet this competition by stable energy prices. Contractors and material producers have also received labor cost breaks that have helped them price their products competitively .

Construction activity. For the first 3 months of 1985, 10 gas-pipeline companies filed construction applications with the Federal Energy Regulatory Commission (FERC) for permission to build about 278 miles of transmission gas trunk pipelines. Included in these applications were 17 pipeline construction projects ranging in size from 4 through 42 in. Total cost of these projects was about $45.4 million (Table 2).

While the number of onshore gas-pipeline projects filed during first quarter 1985 was comparable to a year earlier, the length and cost of these projects decreased appreciably. Building activity at this point in 1984 showed 829 miles of line at a cost of $269.8 million, whereas first quarter 1985 activity revealed only 278 miles of line at a cost of $45.4 million.

Gas-pipeline construction activity offshore, however, was a completely different story. Five gas-pipeline companies filed applications with the FERC to build about 134 miles of line in the Gulf of Mexico. A total of 12 construction projects ranged in size from 10 to 24 in. The total cost of these projects was about $40.0 million (Table 2).

Table 1

OGJ-Morgan gas-pipeline cost indexes (1976 = 100)

Cost component	Yearly indexes* 1980	1981	1982	1983	1984	1985 1st qtr.
1. Steel line pipe	158	187	193	188	193	194
2. Valves and fittings (gas)	155	181	186	182	187	188
3. Pipeline installation	156	180	193	200	204	205
4. Line pipe coating	146	163	171	178	183	184
5. Compressor equipment & drive units	163	181	196	203	207	208
6. High-pressure gas station piping	153	179	192	192	197	198
7. Plant piping	158	181	192	194	199	200
8. Mechanical equipment	135	151	162	167	169	170
9. Electrical Equipment	134	146	155	161	164	165
10. Compressor & auxiliary buildings	135	146	152	158	162	163
11. Measurement & regulating station equipment	140	155	166	170	174	175
12. Communication equipment	134	147	154	159	163	164
13. Transportation equipment	142	156	165	174	178	180
Total composite index	**156**	**180**	**190**	**192**	**196**	**197**

*Index shown for each year is that of final quarter. For indexes 1977-79, see OGJ, Apr. 25, 1983, p. 81.

Comparison of first quarter 1985 construction activity to the same period of 1984 reveals the following facts. In 1984 only three companies filed for construction permits for six projects to build about 84 miles of gas-gathering pipelines in the Gulf of Mexico. Similar early 1985 construction activity showed five companies filed permits for 12 projects to build 134 miles of gathering pipelines.

This comparison of offshore pipeline construction activity shows a yearly increase of 100% in the number of projects and 60% increase in the total mileage of lines to be built in the Gulf of Mexico.

A further comparison of the first quarter 1985 land and offshore construction projects shows the difficulties in comparing the two areas of construction, given the substantial price differential for similar sizes of pipelines.

Table 3 shows an overall ratio approximately 30% higher for offshore pipeline construction compared to comparably sized land projects. However, among individual line size categories, such as 12 and 20 in., offshore costs were about 67% higher than land costs.

Gas-pipeline cost components. Of the 13 cost components which comprise the gas-pipeline cost index (Table 1), five account for approximately 88% of the total gas-pipeline construction costs; steel line pipe (gas), pipeline installation, pipe coating, compressor equipment and drive units, and high-pressure gas station piping.

First quarter 1985 construction costs for these major components showed an overall increase of 0.51% as compared to 0.73% for first quarter 1984.

Pipeline contractors have benefited from the moderate price increases for key materials, such as lumber, steel, and concrete Furthermore, competition is still keeping contractors on their toes and labor and materials markets in line.

Review of the five major gas-pipeline cost components shows a narrow range of modest price increases from 0.48% to a maximum of 0.55%. The total of these increases in the composite gas-pipeline building cost index was a modest increase of 0.51% for first quarter 1985 (Table 1, Fig. 1).

St[illegible] line pipe (gas). For the second consecutive year, 1984 proved to be catastrophic for the domestic steel mills. Under the strain of fierce foreign competition for a shrinking market, domestic steel prices collapsed.

Balance sheets for domestic companies have been ravaged by losses exceeding $6 billion since 1982. And

Table 2

U.S. gas-pipeline construction—1st qtr 1985

	No. of projects	Size of line, in.	Length of project, miles	Cost/ft range, $	Total cost, $
ONSHORE					
	1	4	15.50	2.28	186,500
	4	12	44.10	23.19-25.35	5,633,920
	3	16	164.50	9.20-10.07	8,086,000
	1	20	16.30	99.28	8,544,478
	1	22	0.70	411.30	1,521,800
	5	24	27.74	67.66-174.01	13,865,834
	1	36	4.13	247.51	5,397,255
	1	42	5.44	74.30	2,135,926
Total	**17**		**278.41**	**$30.87**	**$45,371,713**
OFFSHORE					
	1	6	5.87	28.98	898,400
	1	10	15.00	27.76	2,918,300
	3	12	37.30	33.57-63.95	7,935,700
	3	20	10.38	167.15-167.89	9,163,846
	4	24	65.48	37.76-700.30	19,773,500
Totals	**12**		**134.03**	**$56.48**	**$39,969,746**

Source: U.S. Federal Energy Regulatory Commission.

Table 3

Construction costs: onshore vs. offshore*

Size of line, in.	Construction costs, $/ft		Ratio, offshore/land
	Onshore	Offshore	
12	24.20	40.29	1.66
20	99.28	167.20	1.68
24	94.67	57.19	0.60
		Overall ratio	1.31

Source: U.S. Federal Energy Regulatory Commission.
*For 1st qtr. 1985.

while the U.S. economy in general entered its third year of post-recession prosperity, U.S. steelmakers still are unable to operate at a profit.

The condition of the domestic steel market in first quarter 1985, however, showed a slight improvement over the past 2 years. Orders for major pipeline projects have increased the production for major domestic steelmakers.

In late March of this year, Bethlehem Steel Corp. resumed production of large diameter line pipe at its Steelton, Pa., plant following major pipe orders received from four oil and gas-pipeline companies. Since the beginning of fourth quarter 1984, the pipe plant had been idle.

Increased demand for steel line pipe influenced the domestic steel mills' pricing policies for first quarter 1985. Inventory prices were beginning to firm with increases for structural steel slightly more than 5%.

And discounts for large diameter line pipe are significantly less than in 1984. A buyer's 1984 discount for structural steel and plate may have been $200/ton off the published book price. In the first quarter 1985, however, the discount was down to $140/ton.

The net overall effect was a minor increase in the cost. Consequently, the steel line pipe (gas) index increased about 0.52%, from 193 to 194 (Table 1, Fig. 2).

Pipe coating. Pipe coating costs recognize the various types of external coating applied to steel line pipe. Included in these applications are coal-tar products, tapes, and concrete-coated river pipe. The coatings are applied either in coating yards or over the pipeline ditch by machinery.

A review of the various components shows material cost increases of 0.75% and machinery application cost increases of 0.45%.

Weighting these two components together produces a quarterly cost increase of 0.62%. Therefore, the index for pipe coating increased from 183 to 184 for first quarter 1985 (Table 1, Fig. 2).

Pipeline installation. A resurging pipeline construction market together with high labor costs in densely populated areas combined to increase the cost of pipeline installation by 0.5% in first quarter 1985 (Table 1, Fig. 2).

Of the 17 onshore pipeline project permits submitted in the first 3 months of 1985, 7 were located in the states of New Jersey and New York, highly congested areas with associated high labor costs.

For example one 36-in. job projects a unit cost of $247.51/ft, and five 24-in. projects ranged in cost from $67.66/ft to $174.01/ft. A summary of these projects is contained in Table 2.

Costs that comprise the pipeline installation cost component have been summarized earlier (OGJ, Sept. 16, p. 105). A review of the three major subcomponents follows:

- Labor rates. Labor costs continued to rise steadily during first quarter 1985, despite an upturn in construction activity. Wage increases this year seem to be following 1984's trend toward smaller raises and more productive work practices.

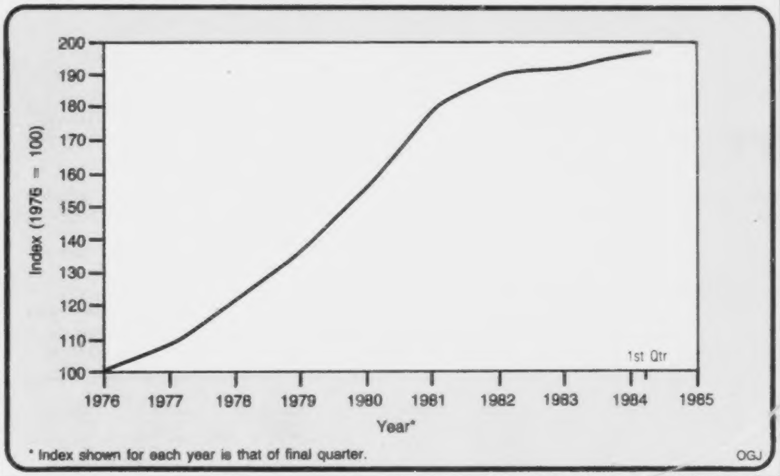
Construction wages rose only 0.7% during the quarter, according to Engineering News-Record (ENR). With few labor shortages in sight and hot competition for open-shop contractors, wage hikes for the spring were expected to maintain their moderate level.

Hourly pay packages for common laborers increased less than 1% in the 6 months ending in March, ENR reported. Common laborers' wage and fringe benefits were reported at $15.91/hr, only 2.4% above 1984's comparable level.

Skilled labor's hourly pay leveled off even more in that 6-month period, according to ENR's 20-city figures. Since the previous June, ENR's index of skilled labor (average of carpenters, structural ironworkers, and bricklayers) remained the same with hourly

Fig. 1

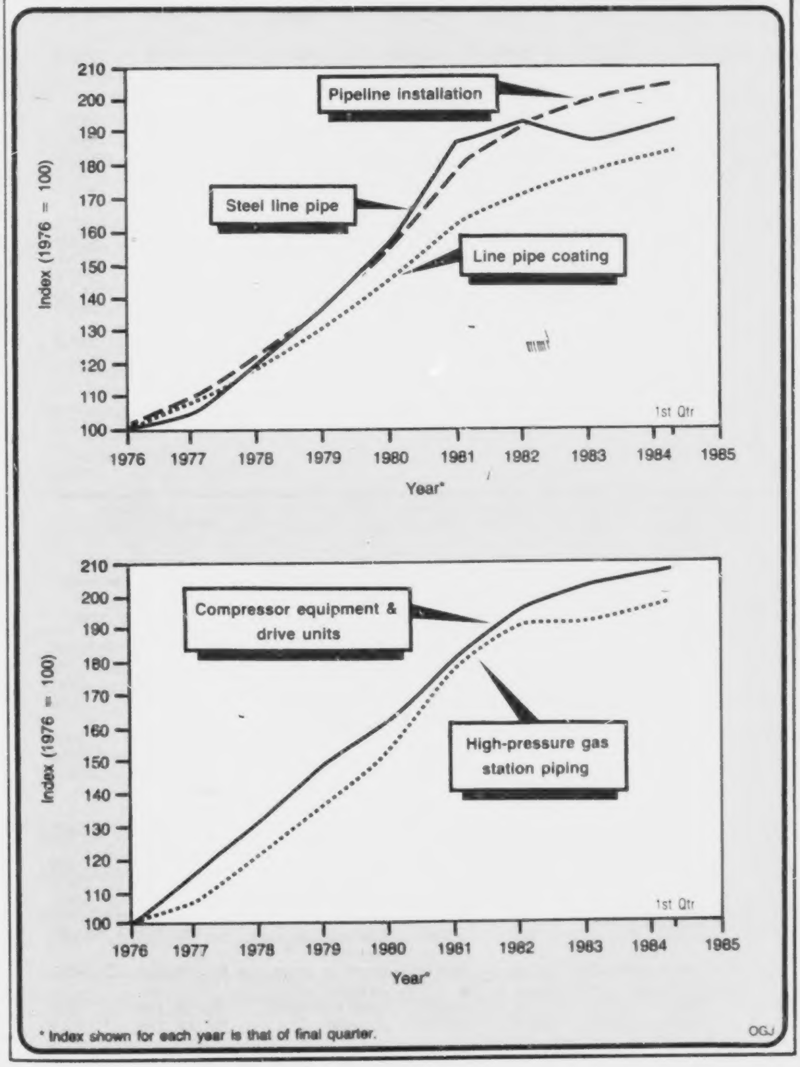
OGJ-Morgan composite gas-pipeline cost index



* Index shown for each year is that of final quarter.

Fig. 2

OGJ-Morgan gas-pipeline cost component indexes



* Index shown for each year is that of final quarter.

pay remaining at $20.89. This rate tops 1984 by only 2.6%.

By the end of first quarter 1985, labor agreements between the Pipe Line Contractors Association and the Pipeliners Union had not been completed. Indications were, however, that pipeline labor cost increases would run less than 1% for the quarter.

- Machinery. Construction machinery prices in first quarter 1985 rose only 0.2%, according to the Bureau of Labor Statistics (BLS). The average annual increase was only 1.0% which amounted to 1% less than 1984's comparable price increase.

Some of the largest quarterly price decreases were for crawler tractors that averaged −2.6%. Off-highway wheel tractor prices decreased slightly but still averaged 3.5% above last year.

Lower oil prices helped contractor's operating costs. Diesel fuel prices fell for the third consecutive quarter and by March averaged 8% below a year earlier.

- Miscellaneous materials. Prices for lumber, steel, and concrete showed a range of price fluctuations from −0.53% to +0.64% during first quarter 1985.

Consideration of all of these items reveals that the cost of gas-pipeline installation increased by 0.5% for the quarter. The pipeline installation index, therefore, was increased from 204 to 205 for first quarter 1985 (Table 1, Fig. 2).

Compressor, drive units. The composite cost index for compressor equipment and drive units increased approximately 0.5% during first quarter 1985.

The material components included in this index fluctuated as follows: compressors, +0.49%; electric motors, +0.73%; reciprocating engines, −0.06%; and turbines, +0.50%. The corresponding labor cost for installing these units increased about 0.47%.

Weighting these factors together produces a quarterly increase of 0.45% and a corresponding index of 208 (Table 1, Fig. 2).

Station piping. Cost elements of this component have been defined earlier (OGJ, Sept. 16, p. 106).

A weighted average of material, freight, and labor costs shows that the installation cost of high-pressure gas station piping increased about 0.51% during first quarter 1985, yielding a quarterly index of 198 (Table 1, Fig. 2).

In future issues of the OGJ-Morgan Pipeline Cost Index—Gas series, quarterly index projections will be developed for 1985 for the 13 cost components of gas-pipeline construction. •

How indexes have risen

Gerald L. Farrar
Contributing Editor

The Nelson refinery construction (inflation) index rose at a much slower rate in 1983 and 1984 than it had for other recent 2-year periods. In January 1983, the index stood at 1001.3, while in December 1984, it had risen to 1068.2. The increase over the 2-year period was only 6.7%.

The largest increase in the components used to make up the refinery inflation index was that of labor. The labor index was 1201.8 in January 1983. By December 1984, it had risen to 1288.6. This amounts to a 7.2% increase over the 2 years. Materials index rose from 700.4 to 737.4 over the 2-year period.

Miscellaneous equipment index remained rather steady, with values of the 2-year period varying randomly from a low of 654.9 to 670.0.

Refinery operations cost index varied randomly from a low of 405.6 to a high of 429.1. At the same time, process unit cost index varied over a range of 553.6 to 593.5. Largest values for both operations indexes occurred in January 1984, when fuel prices were at their highest. ▪

Nelson Cost Indexes, 1983 and 1984

	Refinery construction				Refinery operation	
	Material component	Labor component	Inflation index	Miscellaneous equipment	Refinery operations	Process units
1983						
Jan.	700.4	1201.8	1001.3	660.0	413.4	558.0
Feb.	707.9	1208.2	1008.1	656.9	418.0	556 8
Mar.	709.8	1208.2	1008.8	657.1	419.3	556.9
Apr.	710.0	1208.2	1008.9	656.2	410.6	553.6
May	709.5	1209.3	1009.4	656.5	408.1	558.1
June	708.4	1233.2	1023.3	654.9	405.6	562.4
July	710.1	1244.1	1030.6	656.4	407.8	563.9
Aug.	711.9	1254.0	1037.1	655.2	408.3	568.4
Sept.	718.2	1261.8	1044.4	656.4	411.1	574.7
Oct.	718.7	1261.8	1044.6	655.8	416.0	576.8
Nov.	720.8	1265.0	1047.3	656.8	416.2	576.3
Dec.	723.4	1261.5	1046.3	659.7	420.5	580.2
Year	**712.4**	**1234.8**	**1025.8**	**656.8**	**412.9**	**565.5**
1984						
Jan.	727.8	1263.2	1049.0	660.8	429.1	593.5
Feb.	731.6	1263.6	1050.8	661.0	418.2	592.2
Mar.	732.3	1266.4	1052.9	662.8	419.3	585.5
Apr.	734.3	1267.1	1054.0	665.5	420.3	587.4
May	735.3	1271.0	1056.7	664.7	414.5	582.9
June	735.4	1277.9	1060.9	664.8	414.6	584.3
July	737.7	1279.7	1062.5	666.7	416.8	585.2
Aug.	737.0	1290.3	1069.0	667.1	412.7	575.6
Sept.	738.3	1292.1	1070.6	669.0	414.9	579.8
Oct.	738.8	1288.2	1068.4	666.7	415.9	582.1
Nov.	738.4	1288.6	1068.6	670.0	416.9	581.3
Dec.	737.4	1288.6	1068.2	667.5	415.0	580.3
Year	**735.3**	**1278.1**	**1061.0**	**665.6**	**417.4**	**584.2**

Itemized refining cost indexes

The cost indexes may be used to convert prices at any date to prices at other dates by ratios to the cost indexes of the same date. Item indexes are published each quarter (first week issue of January, April, July, and October). In addition the Nelson Construction and Operating Cost indexes are published in the first issue of each month of The Oil and Gas Journal.

Operating cost (based on 1956 = 100.0):	**1954**	**1972**	**1982**	**1983**	**1984**	**May, 1985**	*** References**	**Index for earlier year in Costimating and Questions on Technology issues**
Power, industrial electrical	98.5	131.2	488.3	508.4	537.2	554.9	Code 0543	No. 13, May 19, 1958
Fuel, refinery price	85.5	152.0	870.1	869.4	921.3	828.8	Oil & Gas J.	No. 4, Mar. 17, 1958
Gulf cargoes	85.0	130.4	1244.9	1213.1	1288.7	1007.5	Oil & Gas J.	No. 4, Mar. 17, 1958
N.Y. barges	82.6	169.6	1100.2	1062.2	1123.7	965.6	Oil & Gas J.	No. 4, Mar. 17, 1958
Chicago low sulfur			1047.9	1078.1	1191.0	1170.2	Oil & Gas J.	July 7, 1975
S. Pedro bunkers	84.3	168.1	1155.2	1195.0	1260.5	1109.8	Oil & Gas J.	No. 4, Mar. 17, 1958
Oklahoma, northern shipments	60.2	128.1	1345.4	1316.9	1385.6	1299.0	Oil & Gas J.	No. 4, Mar. 17, 1958
Natural gas at wellhead	83.5	190.3	2104.5	2249.5	2236.3	2272.4	Code 531-10-1	No. 4, Mar. 17, 1958
Inorganic chemicals	96.0	123.1	405.1	381.6	380.4	388.8	Code 613	Oct. 5, 1964†
Acid, hydrofluoric	95.5	144.4	406.2	406.6	407.5	407.5	Code 613-0222	Apr. 3, 1963†
Acid, sulfuric	100.0	140.7	394.8	363.3	352.9	363.3	Code 613-0281	No. 94, May 15, 1961
Platinum	92.9	121.1	465.8	465.8	405.8	276.1	Code 1022-02-73	July 5, 1965, p. 117
Sodium carbonate	90.9	119.4	407.4	383.0	351.0	330.5	Code 613-01-03	No. 58, Oct. 12, 1959
Sodium hydroxide	95.5	136.2	606.9	453.2	359.7	380.6	Code 613-01-04	No. 94, May 15, 1961
Sodium phosphate	97.4	107.0	482.4	481.6	492.5	530.2	Code 613-0267	No. 58, Oct. 12, 1959
Organic chemicals	100.0	87.4	338.7	332.1	330.6	317.9	Code 614	Oct. 5, 1964†
Furfural	94.5	137.5	473.6	550.0	550.0	550.0	Chemical Marketing Reporter	No. 58, Oct. 12, 1959
MEK, tank-car lots	82.6	87.5	294.5	301.4	300.0	300.0	Chemical Marketing Reporter	No. 58, Oct. 12, 1959
Phenol	90.4	47.1	196.9	193.9	213.3	230.7	Code 614-0241	No. 58, Oct. 12, 1959
TEL	102.8	101.6	290.6	307.6	334.8	344.0	Supplier	No. 58, Oct. 12, 1959

Itemized refining cost indexes (continued)

Operating cost (based on 1956 = 100.0):	1954	1972	1982	1983	1984	May, 1985	* References	Index for earlier year in Costimating and Questions on Technology issues
Operating labor cost (1956 = 100)								
Wages & benefits	88.7	210.0	574.7	621.9	629.9	621.7	Employ & Earn	No. 41, Feb. 16, 1969
Productivity	97.2	197.0	178.6	186.7	204.5	212.6	Employ & Earn	No. 41, Feb. 16, 1969
Construction labor cost (1946 = 100)								
Skilled const.	174.6	499.9	1031.4	1106.1	1147.5	1165.5	Eng. News Record	No. 55, Nov. 3, 1949
Common labor	192.1	630.6	1388.8	1473.7	1520.5	1549.9	Eng. News Record	No. 55, Nov. 3, 1949
Refinery cost	183.3	545.9	1156.5	1234.8	1278.1	1300.0	Oil & Gas J.	May 15, 1967
Equipment or materials (1946 = 100):								
Bubble tray	161.4	324.4	739.5	788.5	818.3	826.3	Computed	July 8, 1962, p. 113
Building materials (nonmetallic)	143.6	212.4	538.4	547.8	567.7	584.7	Code 13	No. 61, Dec. 15, 1949
Brick—building	144.7	252.5	645.2	698.5	724.4	741.9	Code 1341	No. 20, Mar. 3, 1949
Brick—fireclay	193.1	322.8	844.9	858.0	906.8	931.9	Code 135	May 30, 1955†
Castings, iron	188.1	274.9	828.1	840.5	863.7	869.6	Code 1015‡	Apr. 1, 1963†
Clay products (structural, etc.)	159.1	342.0	537.5	572.6	592.2	603.8	Code 134	No. 20, Mar. 3, 1949
Concrete ingredients	141.1	218.4	546.6	541.1	561.9	583.4	Code 132	No. 22, March 17, 1949
Concrete products	138.5	199.6	475.4	479.6	492.4	509.1	Code 133	Oct. 2, 1967, p. 112
Electrical machinery	159.9	216.3	453.8	469.0	486.5	497.5	Code 117	May 2, 1955†
Motors and generators	157.7	211.0	534.7	563.5	583.3	604.0	Code 1173	No. 31, May 19, 1949
Switchgear	171.2	271.0	630.5	647.3	665.7	674.2	Code 1175	May 2, 1955†
Transformers	161.9	149.3	357.2	358.9	363.1	372.8	Code 1174	No. 31, May 19, 1949
Engines (combustion)	150.5	233.3	627.7	653.7	663.1	667.8	Code 1194	No. 36, June 23, 1949
Exchangers (composite)	171.7	274.3	635.9	541.7	530.9	525.2	Manufacturer	Mar. 16, 1964†
Copper base	190.7	266.7	578.9	502.0	495.5	511.0	Manufacturer	Mar. 16, 1964†
Steel	156.8	281.9	675.3	569.1	555.3	535.0	Manufacturer	Mar. 16, 1964†
Fractionating towers	151.0	278.5	644.7	663.4	674.9	677.8	Computed	June 8, 1963, p. 133
Hand tools	173.8	346.5	906.3	932.3	965.3	1006.6	Code 1042	June 27, 1955†
Instruments (composite)	154.6	328.4	652.5	675.2	696.7	708.4	Manufacturer	No. 34, June 9, 1949
Insulation (composite)	198.5	272.4	884.1	948.2	1057.9	1088.8	Manufacturer	Apr. 3, 1961, p. 193†
Lumber (composite)	197.9	353.4	687.8	784.7	779.6	779.2	Code 81	No. 7, Dec. 2, 1948
Southern pine	181.2	303.9	564.6	640.8	640.2	652.4	Code 811-02	No. 7, Dec. 2, 1948
Redwood, all heart	238.0	310.6	1080.6	1154.8	1089.9	1049.4	Code 811-03-16	July 5, 1965, p. 117
Machinery:								
General purpose	159.9	278.5	690.8	701.0	714.2	730.5	Code 114	Feb. 17, 1949
Construction	165.9	324.4	882.6	907.7	924.3	935.3	Code 112	Apr. 1, 1968, p. 184
Oilfield	161.9	269.1	926.5	902.3	898.3	901.4	Code 1191	Oct. 10, 1955†
Paints—prepared	159.0	231.8	517.9	520.6	534.2	545.6	Code 621	May 16, 1955†
Pipe:								
Clay sewer	140.1	207.4	417.8	440.4	441.4	--	Code 1345-01-01	No. 22, Mar. 17, 1949
Gray iron pressure	195.0	346.9	1060.0	1071.8	1101.4	1151.5	Code 1015-0239	Jan. 3, 1983
Standard carbon	182.7	319.9	994.4	879.4	923.3	938.0	Code 1017-0611	Jan. 3, 1983
Pumps, compressors, etc.	166.5	337.5	944.1	944.5	950.5	967.4	Code 1141	No. 29, May 5, 1949
Steel-mill products	187.1	330.6	885.4	894.4	927.4	930.4	Code 1017	Jan. 3, 1983
Alloy bars	198.7	349.4	952.9	884.2	896.3	884.4	Code 1017-0831	Apr. 1, 1963†
Cold-rolled sheets	187.0	365.5	967.7	974.4	1027.2	1025.3	Code 1017-0711	Jan. 3, 1983
Alloy sheets	177.0	225.9	433.8	450.1	472.6	474.4	Code 1017-0733	Jan. 3, 1983
Stainless strip	169.0	221.2	429.9	439.0	495.2	484.4	Code 1017-0755	Jan. 3, 1983
Structural carbon, plates	193.4	386.7	1082.1	1018.7	1043.5	1046.4	Code 1017-0400	Jan. 3, 1983
Seamless carbon tubing	199.4	347.3	913.2	922.9	865.8	912.5	Code 1017-0621	Jan. 3, 1983
Welded carbon tubing	180.0	265.5	943.9	843.7	929.6	939.4	Code 1017-0622	Jan. 3, 1983
Tanks and pressure vessels	147.3	246.4	601.1	591.0	589.8	588.3	Code 1072	No. 5, Nov. 18, 1949
Tube stills	123.0	125.3	317.0	324.0	339.0	341.6	Computed	Oct. 1, 1962†
Valves and fittings	197.0	350.9	931.8	938.8	966.3	991.3	Code 11-49-01	No. 46, Sept. 1, 1940
Nelson Refinery (Inflation Index)	179.8	438.5	976.9	1025.8	1061.0	1076.0	Oil & Gas J.	May 15, 1969
Nelson Refinery Operation (1956)	88.7	118.5	396.6	412.9	417.4	406.3	Oil & Gas J.	No. 2, Mar. 3, 1958
Nelson Refinery Process Operation (1956)	88.4	147.0	557.2	565.5	584.2	548.9	Oil & Gas J.	No. 2, Mar. 3, 1958

*Code refers to the index number of the Bureau of Statistics, U.S. Department of Labor, "Wholesale Prices." †Questions of Technology or itemized Cost Indexes. The Oil and Gas Journal. ‡Revised, using only part of items listed under code number.

NELSON COST INDEX

Refinery construction (1946 basis)

Explained on p. 68 of the issue of Nov. 29, 1976

	1962	1973	1982	1983	1984	July, 1984	June, 1985	July, 1985
Pumps, compressors, etc	222.5	346.9	944.1	944.5	950.5	952.1	969.0	969.8
Electrical machinery	189.5	220.2	453.8	469.0	486.5	487.0	497.3	496.4
Internal-comb. engines	183.4	238.3	627.7	653.7	663.1	663.2	667.8	666.9
Instruments	214.8	338.0	652.5	675.2	696.8	692.8	712.3	714.1
Heat exchangers	183.6	313.7	635.9	541.7	530.9	538.5	525.2	522.6
Misc. equip. average	198.8	291.4	662.8	656.8	665.6	666.7	674.3	674.0
Materials component	205.9	292.3	707.6	712.4	735.3	736.7	739.4	738.6
Labor component	258.8	585.2	1,156.5	1,234.8	1,278.1	1,279.7	1,300.8	1,300.8
Nelson Refinery (Inflation) Index	237.6	468.0	976.9	1,025.8	1,061.0	1,062.5	1,076.3	1,075.9

Refinery operating (1956 basis)

Explained on p. 86 of the issue of Jan. 10, 1977

	1962	1973	1982	1983	1984	July, 1984	June, 1985	July, 1985
Fuel cost	100.9	186.8	931.1	913.8	968.3	974.0	832.2	837.8
Labor cost	93.9	102.9	321.8	334.5	308.0	304.1	292.4	282.7
Wages	123.9	221.2	574.7	621.9	629.9	619.5	638.3	631.0
Productivity	131.8	214.9	178.6	186.7	204.5	203.7	218.3	223.2
Invest., maint., etc	121.7	193.0	385.0	415.3	436.6	437.2	446.6	446.4
Chemical costs	96.7	117.3	234.1	231.3	233.4	235.2	227.2	215.4
Nelson operating indexes								
Refinery	103.7	125.7	396.6	412.9	417.4	416.8	403.0	398.6
Process units*	103.6	168.0	557.2	565.5	584.2	585.2	535.3	534.3

*Add separate index(es) for chemicals, if any are used. See current Quarterly Costimating, first issue, months of January, April, July, and October.

These indexes are published in the first issue of each month. They are compiled by Gerald L. Farrar, Journal Contributing Editor.

Indexes of selected individual items of equipment and materials are also published on the Costimating page in the first issue of the months of January, April, July, and October.

Hughes rig count

	7-29-85	7-30-84
Alabama	30	15
Alaska	18	15
Arkansas	21	29
Arizona	0	0
California	76	104
Land	67	88
Offshore	9	16
Colorado	34	51
Florida	6	5
Illinois	31	55
Indiana	3	8
Kansas	104	129
Kentucky	5	11
Louisiana	260	292
North	23	26
S. Inland Waters	43	48
S. Land	80	90
Offshore	114	128
Maryland	0	1
Michigan	38	35
Mississippi	25	23
Montana	28	41
Nebraska	6	8
New Mexico	66	77
New York	3	8
North Dakota	37	61
Ohio	28	52
Oklahoma	233	309
Pennsylvania	26	35
South Dakota	3	1
Texas	662	806
Offshore	43	62
Inland Waters	3	3
Dist. 1 & 4	73	100
Dist. 2 & 3	102	119
Dist. 5 & 6	76	102
Dist. 7B & 9	85	115
Dist. 7C,8 & 8A	238	265
Dist. 10	42	40
Utah	22	51
West Virginia	24	48
Wyoming	87	114
Others–Nv -7, Va -7	14	13
Total U.S.	**1,890**	**2,397**
Cum. Avg. to Date	**2,020**	**2,358**
Canada	330	236
Canada-Offshore	10	13
Grand Total	**2,230**	**2,646**

Rotary rigs from spudding in to total depth

Source: Hughes Tool Co.
Data available in Oil & Gas Journal Energy Database

Hughes rig count

	8-26-85	8-27-84
Alabama	24	17
Alaska	21	15
Arkansas	22	31
Arizona	0	0
California	89	101
Land	80	84
Offshore	9	17
Colorado	55	57
Florida	6	3
Illinois	41	53
Indiana	5	8
Kansas	98	135
Kentucky	8	9
Louisiana	275	297
North	29	32
S. Inland Waters	41	44
S. Land	80	87
Offshore	125	134
Maryland	0	0
Michigan	34	41
Mississippi	21	40
Montana	20	37
Nebraska	9	6
New Mexico	64	72
New York	6	7
North Dakota	48	54
Ohio	31	59
Oklahoma	242	275
Pennsylvania	25	43
South Dakota	1	3
Texas	634	809
Offshore	37	57
Inland Waters	4	5
Dist. 1 & 4	77	99
Dist. 2 & 3	89	126
Dist. 5 & 6	71	112
Dist. 7B & 9	78	114
Dist. 7C,8 & 8A	241	257
Dist. 10	37	39
Utah	23	47
West Virginia	27	37
Wyoming	97	123
Others–Hi- 1, Id -1, Nv -5, Va -7	14	16
Total U.S.	**1,940**	**2,395**
Cum. Avg. to Date	**2,010**	**2,364**
Canada	296	243
Canada-Offshore	11	17
Grand Total	**2,247**	**2,655**

Rotary rigs from spudding in to total depth

Source: Hughes Tool Co.
Data available in Oil & Gas Journal Energy Database

Hughes rig count

	9-30-85	10-1-84
Alabama	22	13
Alaska	23	14
Arkansas	26	26
Arizona	1	0
California	76	108
Land	66	91
Offshore	10	17
Colorado	58	58
Florida	8	3
Illinois	32	54
Indiana	2	5
Kansas	102	145
Kentucky	10	9
Louisiana	256	302
North	15	26
S. Inland Waters	41	49
S. Land	76	89
Offshore	124	138
Maryland	0	0
Michigan	45	35
Mississippi	36	37
Montana	18	38
Nebraska	5	8
New Mexico	73	84
New York	9	10
North Dakota	50	41
Ohio	20	60
Oklahoma	233	280
Pennsylvania	35	43
South Dakota	1	2
Texas	626	862
Offshore	48	55
Inland Waters	3	5
Dist. 1 & 4	68	97
Dist. 2 & 3	88	154
Dist. 5 & 6	78	98
Dist. 7B & 9	69	120
Dist. 7C,8 & 8A	243	285
Dist. 10	29	48
Utah	24	47
West Virginia	29	41
Wyoming	101	113
Others–Id -1, Nv -4, Va -8, Or -1	14	14
Total U.S.	**1,935**	**2,452**
Cum. Avg. to Date	**2,000**	**2,372**
Canada	256	171
Canada-Offshore	9	13
Grand Total	**2,200**	**2,636**

Rotary rigs from spudding in to total depth

Source: Hughes Tool Co.
Data available in Oil & Gas Journal Energy Database

Hughes rig count

	10-28-85	10-29-84
Alabama	22	16
Alaska	18	14
Arkansas	24	24
Arizona	1	0
California	78	116
Land	67	92
Offshore	11	24
Colorado	62	60
Florida	10	5
Illinois	28	48
Indiana	5	10
Kansas	93	112
Kentucky	9	6
Louisiana	243	318
North	9	30
S. Inland Waters	39	51
S. Land	73	92
Offshore	122	145
Maryland	0	0
Michigan	36	43
Mississippi	30	24
Montana	16	34
Nebraska	7	6
New Mexico	80	97
New York	5	11
North Dakota	46	39
Ohio	31	77
Oklahoma	204	307
Pennsylvania	35	47
South Dakota	1	3
Texas	583	863
Offshore	38	49
Inland Waters	3	5
Dist. 1 & 4	74	97
Dist. 2 & 3	84	145
Dist. 5 & 6	72	97
Dist. 7B & 9	62	134
Dist. 7C,8 & 8A	222	293
Dist. 10	28	43
Utah	30	44
West Virginia	33	40
Wyoming	89	129
Others–Hi -1, Id -2, Nv -8, Va -7, Or -1	19	10
Total U.S.	**1,838**	**2,503**
Cum. Avg. to Date	**1,989**	**2,384**
Canada	284	252
Canada-Offshore	10	13
Grand Total	**2,132**	**2,768**

Rotary rigs from spudding in to total depth

Source: Hughes Tool Co.
Data available in Oil & Gas Journal Energy Database

Hughes rig count

	11-25-85	11-26-84
Alabama	23	16
Alaska	19	18
Arkansas	20	28
Arizona	0	0
California	85	130
Land	74	110
Offshore	11	20
Colorado	63	64
Florida	12	4
Illinois	21	43
Indiana	3	11
Kansas	89	141
Kentucky	6	6
Louisiana	259	348
North	17	27
S. Inland Waters	44	63
S. Land	78	104
Offshore	120	154
Maryland	0	0
Michigan	33	44
Mississippi	34	33
Montana	25	37
Nebraska	5	13
New Mexico	80	89
New York	5	9
North Dakota	54	50
Ohio	34	74
Oklahoma	242	326
Pennsylvania	32	27
South Dakota	1	4
Texas	634	944
Offshore	36	52
Inland Waters	4	2
Dist. 1 & 4	74	107
Dist. 2 & 3	92	146
Dist. 5 & 6	59	92
Dist. 7B & 9	80	151
Dist. 7C,8 & 8A	259	334
Dist. 10	30	60
Utah	27	48
West Virginia	34	30
Wyoming	96	133
Others–Hi -1, Id -2, Nv -6, Va -1	10	12
Total U.S.	**1,946**	**2,682**
Cum. Avg. to Date	**1,983**	**2,404**
Canada	379	290
Canada-Offshore	6	13
Grand Total	**2,331**	**2,985**

Rotary rigs from spudding in to total depth

Source: Hughes Tool Co.
Data available in Oil & Gas Journal Energy Database

Hughes rig count

	12-23-85	12-24-84
Alabama	22	19
Alaska	19	23
Arkansas	11	30
Arizona	0	0
California	82	133
Land	71	114
Offshore	11	19
Colorado	64	64
Florida	10	4
Illinois	24	38
Indiana	3	4
Kansas	94	128
Kentucky	6	6
Louisiana	287	357
North	20	37
S. Inland Waters	48	57
S. Land	87	118
Offshore	132	145
Maryland	0	0
Michigan	42	44
Mississippi	33	38
Montana	24	37
Nebraska	9	11
New Mexico	80	77
New York	5	13
North Dakota	44	55
Ohio	50	56
Oklahoma	259	309
Pennsylvania	27	46
South Dakota	3	6
Texas	633	917
Offshore	36	61
Inland Waters	4	2
Dist. 1 & 4	79	123
Dist. 2 & 3	101	155
Dist. 5 & 6	59	98
Dist. 7B & 9	79	111
Dist. 7C, 8 & 8A	240	310
Dist. 10	35	57
Utah	31	45
West Virginia	31	42
Wyoming	94	135
Others–Hi-1 Id -2 Nev -5	8	13
Total U.S.	**1,995**	**2,650**
Cum. Avg. to Date	**1,981**	**2,428**
Canada	415	353
Canada Offshore	6	8
Grand Total	**2,416**	**3,011**

Hughes rig count

	1-28-85	1-30-84
Alabama	8	14
Alaska	24	15
Arkansas	32	29
Arizona	0	0
California	98	95
Land	79	74
Offshore	19	21
Colorado	55	54
Florida	5	8
Illinois	32	48
Indiana	7	5
Kansas	105	133
Kentucky	5	7
Louisiana	343	345
North	39	31
S. Inland Waters	52	58
S. Land	105	111
Offshore	147	145
Maryland	0	0
Michigan	30	37
Mississippi	33	41
Montana	25	39
Nebraska	12	7
New Mexico	60	76
New York	7	15
North Dakota	37	49

	1-28-87	1-30-84
Ohio	57	56
Oklahoma	297	384
Pennsylvania	41	29
South Dakota	7	2
Texas	789	869
Offshore	56	38
Inland Waters	5	5
Dist. 1 & 4	99	106
Dist. 2 & 3	112	157
Dist. 5 & 6	81	110
Dist. 7B & 9	110	133
Dist. 7C,8 & 8A	280	265
Dist. 10	46	55
Utah	36	50
West Virginia	26	33
Wyoming	112	124
Others–Hi -1, Id -2 Nv -5, Or -2	10	4
Total U.S.	**2,303**	**2,569**
Cum. Avg. to Date	**2,451**	**2,666**
Canada	365	289
Canada-Offshore	11	14
Grand Total	**2,679**	**2,872**

Rotary rigs from spudding in to total depth

Hughes rig count

	3-25-85	3-26-84
Alabama	24	14
Alaska	21	14
Arkansas	30	23
Arizona	0	0
California	75	98
Land	64	76
Offshore	11	22
Colorado	49	53
Florida	5	2
Illinois	13	9
Indiana	3	5
Kansas	99	120
Kentucky	4	5
Louisiana	280	302
North	22	29
S. Inland Waters	42	50
S. Land	83	102
Offshore	133	121
Maryland	0	0
Michigan	11	24
Mississippi	29	32
Montana	23	30
Nebraska	3	10
New Mexico	63	73
New York	0	5
North Dakota	37	47

Rotary rigs from spudding in to total depth
Produced by Oil & Gas Journal Energy Database

	3-25-85	3-26-84
Ohio	18	18
Oklahoma	259	301
Pennsylvania	30	29
South Dakota	0	1
Texas	714	802
Offshore	57	56
Inland Waters	3	8
Dist. 1 & 4	86	98
Dist. 2 & 3	105	139
Dist. 5 & 6	78	104
Dist. 7B & 9	97	103
Dist. 7C,8 & 8A	247	250
Dist. 10	41	44
Utah	29	42
West Virginia	30	28
Wyoming	83	108
Others–Id -2, Nv -3 Va -2	7	11
Total U.S.	**939**	**2,206**
Cum. Avg. to Date	**2,217**	**2,461**
Canada	339	283
Canada-Offshore	7	14
Grand Total	**2,285**	**2,503**

Hughes rig count

	5-27-85	5-28-84
Alabama	22	13
Alaska	15	10
Arkansas	26	25
Arizona	0	0
California	65	109
Land	55	94
Offshore	10	15
Colorado	32	50
Florida	4	3
Illinois	36	52
Indiana	3	6
Kansas	91	129
Kentucky	8	9
Louisiana	273	269
North	25	32
S. Inland Waters	44	49
S. Land	80	77
Offshore	124	111
Maryland	0	0
Michigan	38	33
Mississippi	34	31
Montana	20	25
Nebraska	5	10
New Mexico	68	71
New York	5	10
North Dakota	37	55

Source: Hughes Tool Co.
Data available in Oil & Gas Journal Energy Database

	5-27-85	5-28-84
Ohio	21	45
Oklahoma	251	325
Pennsylvania	18	28
South Dakota	0	1
Texas	642	824
Offshore	47	62
Inland Waters	0	7
Dist. 1 & 4	82	89
Dist. 2 & 3	86	123
Dist. 5 & 6	84	107
Dist. 7B & 9	88	118
Dist. 7C 8 & 8A	215	265
Dist. 10	40	53
Utah	20	39
West Virginia	18	39
Wyoming	84	98
Others–Id -1, Nv -4 Va -7	12	13
Total U.S.	**1,848**	**2,322**
Cum. Avg. to Date	**2,076**	**2,350**
Canada	230	168
Canada-Offshore	11	13
Grand Total	**2,089**	**2,503**

Rotary rigs from spudding in to total depth

Hughes rig count

	2-25-85	2-27-84
Alabama	21	15
Alaska	23	13
Arkansas	28	20
Arizona	0	0
California	79	100
Land	60	80
Offshore	19	20
Colorado	50	52
Florida	6	1
Illinois	20	19
Indiana	7	2
Kansas	92	124
Kentucky	3	6
Louisiana	300	311
North	32	31
S. Inland Waters	45	45
S. Land	90	104
Offshore	133	131
Maryland	0	0
Michigan	37	19
Mississippi	36	36
Montana	19	37
Nebraska	8	9
New Mexico	71	64
New York	6	1
North Dakota	36	41

	2-25-85	2-27-84
Ohio	44	35
Oklahoma	270	368
Pennsylvania	49	27
South Dakota	1	1
Texas	783	808
Offshore	62	38
Inland Waters	5	5
Dist. 1 & 4	98	91
Dist. 2 & 3	121	152
Dist. 5 & 6	94	103
Dist. 7B & 9	100	126
Dist. 7C ,8 & 8A	266	236
Dist. 10	37	57
Utah	36	51
West Virginia	25	27
Wyoming	87	115
Others–Hi -1 Id -2 Nv -3	6	8
Total U.S.	**2,143**	**2,310**
Cum. Avg. to Date	**2,334**	**2,558**
Canada	389	334
Canada-Offshore	9	14
Grand Total	**2,541**	**2,658**

Produced by Oil & Gas Journal Energy Database

Hughes rig count

	4-29-85	4-30-84
Alabama	18	16
Alaska	18	13
Arkansas	19	25
Arizona	0	1
California	66	95
Land	57	81
Offshore	9	14
Colorado	39	48
Florida	4	2
Illinois	34	22
Indiana	4	4
Kansas	86	114
Kentucky	5	4
Louisiana	285	290
North	23	28
S. Inland Waters	42	46
S. Land	85	91
Offshore	135	125
Maryland	0	0
Michigan	21	26
Mississippi	35	28
Montana	22	24
Nebraska	8	9
New Mexico	66	78
New York	2	7
North Dakota	28	45

Source: Hughes Tool Co.
Data available in Oil & Gas Journal Energy Database

	4-29-85	4-30-84
Ohio	7	29
Oklahoma	271	304
Pennsylvania	8	24
South Dakota	1	1
Texas	672	817
Offshore	52	61
Inland Waters	2	5
Dist. 1 & 4	79	86
Dist. 2 & 3	96	130
Dist. 5 & 6	89	100
Dist. 7B & 9	97	127
Dist. 7C 8 & 8A	220	259
Dist. 10	37	49
Utah	30	43
West Virginia	19	32
Wyoming	77	84
Others–Id -1, Nv -3 Va -4, Or -2	10	[illegible]
Total U.S.	**1,855**	**2,199**
Cum. Avg. to Date	**2,123**	**2,366**
Canada	99	[illegible]
Canada-Offshore	8	[illegible]
Grand Total	**1,962**	**2,289**

Rotary rigs from spudding in to total depth

Hughes rig count

	6-24-85	6-25-84
Alabama	21	12
Alaska	18	9
Arkansas	27	22
Arizona	0	1
California	73	96
Land	61	84
Offshore	12	12
Colorado	40	53
Florida	6	3
Illinois	31	53
Indiana	3	7
Kansas	95	137
Kentucky	6	11
Louisiana	280	287
North	25	28
S. Inland Waters	51	56
S. Land	77	86
Offshore	127	117
Maryland	0	0
Michigan	38	33
Mississippi	35	33
Montana	27	33
Nebraska	5	8
New Mexico	75	71
New York	4	10
North Dakota	34	53

Source: Hughes Tool Co.
Data available in Oil & Gas Journal Energy Database

	6-24-85	6-25-84
Ohio	21	45
Oklahoma	243	316
Pennsylvania	26	36
South Dakota	2	1
Texas	648	866
Offshore	53	69
Inland Waters	3	3
Dist. 1 & 4	93	95
Dist. 2 & 3	88	127
Dist. 5 & 6	70	109
Dist. 7B & 9	83	127
Dist. 7C,8 & 8A	220	277
Dist. 10	38	59
Utah	24	41
West Virginia	30	44
Wyoming	82	110
Others–Nev -5 Va -1	6	10
Total U.S.	**1,907**	**2,401**
Cum. Avg. to Date	**2,042**	**2,352**
Canada	316	245
Canada-Offshore	9	13
Grand Total	**2,232**	**2,659**

Rotary rigs from spudding in to total depth

Smith rig count

Proposed depth (feet)	1-25-85 Rig count	1-25-85 % footage*	1-27-84 Rig count	1-27-84 % footage*
0- 2,500	41	48.8	55	76.4
2,501- 5,000	457	87.7	540	90.7
5,001- 7,500	436	72.9	528	75.2
7,501-10,000	508	58.3	555	62.0
10,001-12,500	468	47.2	521	53.6
12,501-15,000	284	27.5	330	28.2
15,001-17,500	168	20.2	129	21.7
17,501-20,000	72	12.5	76	9.2
20,001-over	27	3.7	29	3.4
Total	**2,461**	**56.0**	**2,763**	**60.8**
INLAND	52		66	
LAND	2,150		2,462	
OFFSHORE	259		235	

* Rigs employed under footage contracts.
Source: Smith International Inc.
Definitions, see OGJ 3/19/84, p. 138.

Smith rig count

Proposed depth (feet)	2-22-85 Rig count	2-22-85 % footage*	2-24-84 Rig count	2-24-84 % footage*
0- 2,500	55	50.9	70	62.9
2,501- 5,000	409	88.5	461	90.9
5,001- 7,500	436	76.4	456	75.9
7,501-10,000	474	59.1	517	62.7
10,001-12,500	415	43.1	475	49.9
12,501-15,000	256	29.7	296	29.4
15,001-17,500	158	15.8	141	18.4
17,501-20,000	75	18.7	78	7.7
20,001-over	30	3.3	26	3.8
Total	**2,308**	**56.2**	**2,520**	**59.1**
INLAND	50		55	
LAND	2,018		2,244	
OFFSHORE	240		221	

* Rigs employed under footage contracts.
Source: Smith International Inc.
Definitions, see OGJ 3/19/84, p. 138.

Smith rig count

Proposed depth (feet)	3-29-85 Rig count	3-29-85 % footage*	3-30-84 Rig count	3-30-84 % footage*
0- 2,500	58	56.9	73	58.9
2,501- 5,000	390	87.4	380	86.6
5,001- 7,500	402	71.6	393	74.3
7,501-10,000	419	60.9	481	60.7
10,001-12,500	394	46.4	439	48.1
12,501-15,000	247	33.6	264	34.5
15,001-17,500	146	17.1	130	16.2
17,501-20,000	77	22.1	78	5.1
20,001-over	34	8.8	26	
Total	**2,167**	**56.7**	**2,264**	**56.7**
INLAND	50		49	
LAND	1,888		1,989	
OFFSHORE	229		226	

* Rigs employed under footage contracts.
Source: Smith International Inc.
Definitions, see OGJ 3/19/84, p. 138.

Smith rig count

Proposed depth (feet)	4-26-85 Rig count	4-26-85 % footage*	4-27-84 Rig count	4-27-84 % footage*
0- 2,500	47	[illegible]	[illegible]	[illegible]
2,501- 5,000	[illegible]	[illegible]	[illegible]	[illegible]
5,001- 7,500	[illegible]	[illegible]	[illegible]	[illegible]
7,501-10,000	[illegible]	[illegible]	[illegible]	[illegible]
10,001-12,500	380	45.3	421	[illegible]
12,501-15,000	[illegible]	[illegible]	[illegible]	[illegible]
15,001-17,500	[illegible]	[illegible]	[illegible]	[illegible]
17,501-20,000	[illegible]	[illegible]	[illegible]	[illegible]
20,001-over	[illegible]	[illegible]	[illegible]	[illegible]
Total	**2,118**	**56.3**	**2,427**	**57.6**
INLAND	[illegible]		[illegible]	
LAND	[illegible]		[illegible]	
OFFSHORE	[illegible]		[illegible]	

* Rigs employed under footage contracts.
Definitions, see OGJ 3/19/84, p. 138.
Source: Smith International Inc.
Data available in Oil & Gas Journal Energy Database.

Smith rig count

Proposed depth (feet)	5-31-85 Rig count	5-31-85 % footage*	6-1-84 Rig count	6-1-84 % footage*
0- 2,500	69	58.0	78	60.3
2,501- 5,000	399	84.0	554	90.3
5,001- 7,500	363	74.9	491	71.9
7,501-10,000	436	62.6	508	62.4
10,001-12,500	367	44.7	413	47.2
12,501-15,000	220	24.5	281	23.1
15,001-17,500	136	19.1	132	13.6
17,501-20,000	70	14.3	65	9.2
20,001-over	28		26	3.8
Total	**2,088**	**56.2**	**2,548**	**58.9**
INLAND	44		49	
LAND	1,833		2,277	
OFFSHORE	211		222	

* Rigs employed under footage contracts.
Definitions, see OGJ 3/19/84, p. 138.
Source: Smith International Inc.
Data available in Oil & Gas Journal Energy Database.

Smith rig count

Proposed depth (feet)	6-28-85 Rig count	6-28-85 % footage*	6-29-84 Rig count	6-29-84 % footage*
0- 2,500	67	[illegible]	80	71.2
2,501- 5,000	396	84.8	565	89.0
5,001- 7,500	435	70.6	480	73.1
7,501-10,000	425	65.2	543	63.0
10,001-12,500	355	45.6	429	46.6
12,501-15,000	232	[illegible]	308	[illegible]
15,001-17,500	144	[illegible]	[illegible]	[illegible]
17,501-20,000	71	[illegible]	64	[illegible]
20,001-over	[illegible]	[illegible]	[illegible]	9.5
Total	**2,154**	**56.7**	**2,616**	**60.2**
INLAND	48		[illegible]	
LAND	[illegible]		2,347	
OFFSHORE	[illegible]		[illegible]	

* Rigs employed under footage contracts.
Definitions, see OGJ 3/19/84, p. 138.
Source: Smith International Inc.
Data available in Oil & Gas Journal Energy Database.

Smith rig count

Proposed depth (feet)	7-26-85 Rig count	7-26-85 % footage*	7-27-84 Rig count	7-27-84 % footage*
0- 2,500	60	45.0	77	57.1
2,501- 5,000	394	86.0	541	89.6
5,001- 7,500	408	70.1	525	71.6
7,501-10,000	444	62.8	537	61.8
10,001-12,500	318	46.5	466	45.1
12,501-15,000	225	28.4	322	26.1
15,001-17,500	137	18.2	126	13.5
17,501-20,000	70	8.6	66	13.6
20,001-over	29	6.9	20	10.0
Total	**2,085**	**56.4**	**2,680**	**58.2**
INLAND	43		53	
LAND	1,850		2,385	
OFFSHORE	192		242	

* Rigs employed under footage contracts.
Definitions, see OGJ 3/19/84, p. 138.
Source: Smith International Inc.
Data available in Oil & Gas Journal Energy Database.

Smith rig count

Proposed depth (feet)	8-23-85 Rig count	8-23-85 % footage*	8-24-84 Rig count	8-24-84 % footage*
0- 2,500	67	41.8	83	66.3
2,501- 5,000	407	88.7	571	88.3
5,001- 7,500	411	77.9	483	73.3
7,501-10,000	450	65.1	554	61.4
10,001-12,500	365	45.8	444	45.0
12,501-15,000	223	31.8	289	29.8
15,001-17,500	125	16.8	132	18.2
17,501-20,000	68	7.4	76	21.1
20,001-over	26	7.7	24	4.2
Total	**2,142**	**59.2**	**2,656**	**59.5**
INLAND	46		41	
LAND	1,897		2,377	
OFFSHORE	199		238	

* Rigs employed under footage contracts.
Definitions, see OGJ 3/19/84, p. 138.
Source: Smith International Inc.
Data available in Oil & Gas Journal Energy Database.

Smith rig count

Proposed depth (feet)	9-27-85 Rig count	9-27-85 % footage*	9-28-84 Rig count	9-28-84 % footage*
0- 2,500	80	55.0	74	60.8
2,501- 5,000	409	85.8	544	89.2
5,001- 7,500	386	74.6	516	71.9
7,501-10,000	454	66.1	539	61.8
10,001-12,500	382	44.0	446	44.4
12,501-15,000	215	33.0	284	27.5
15,001-17,500	120	18.3	130	21.5
17,501-20,000	62	12.9	80	18.8
20,001-over	24	4.2	25	16.0
Total	**2,132**	**58.8**	**2,638**	**59.0**
INLAND	44		51	
LAND	1,879		2,353	
OFFSHORE	209		234	

* Rigs employed under footage contracts.
Definitions, see OGJ 3/19/84, p. 138.
Source: Smith International Inc.
Data available in Oil & Gas Journal Energy Database.

Smith rig count

Proposed depth (feet)	10-25-85 Rig count	10-25-85 % footage*	10-26-84 Rig count	10-26-84 % footage*
0- 2,500	70	50.0	49	55.1
2,501- 5,000	404	88.4	497	87.3
5,001- 7,500	378	77.0	468	70.7
7,501-10,000	444	62.6	569	64.1
10,001-12,500	369	42.0	446	45.7
12,501-15,000	205	29.3	312	30.1
15,001-17,500	111	18.9	146	17.8
17,501-20,000	68	8.8	72	19.4
20,001-over	23	8.7	20	15.0
Total	**2,072**	**58.2**	**2,579**	**58.1**
INLAND	47		55	
LAND	1,815		2,284	
OFFSHORE	210		240	

* Rigs employed under footage contracts.
Definitions, see OGJ 3/19/84, p. 138.
Source: Smith International Inc.
Data available in Oil & Gas Journal Energy Database.

Smith rig count

Proposed depth (feet)	11-29-85 Rig count	11-29-85 % footage*	11-30-84 Rig count	11-30-84 % footage*
0- 2,500	72	45.8	76	63.2
2,501- 5,000	367	86.1	579	87.0
5,001- 7,500	418	72.7	527	73.4
7,501-10,000	476	63.4	590	58.1
10,001-12,500	329	46.5	492	48.0
12,501-15,000	231	27.3	318	29.6
15,001-17,500	111	17.1	169	15.4
17,501-20,000	63	11.1	72	19.4
20,001-over	21	9.5	27	11.1
Total	**2,088**	**57.4**	**2,850**	**58.1**
INLAND	51		62	
LAND	1,827		2,539	
OFFSHORE	210		249	

* Rigs employed under footage contracts.
Definitions, see OGJ 3/19/84, p. 138.
Source: Smith International Inc.
Data available in Oil & Gas Journal Energy Database.

Smith rig count

Proposed depth (feet)	12-13-85 Rig count	12-13-85 % footage*	12-14-84 Rig count	12-14-84 % footage*
0- 2,500	75	41.3	77	50.6
2,501- 5,000	432	87.5	563	87.6
5,001- 7,500	412	73.5	574	74.4
7,501-10,000	482	67.0	636	61.6
10,001-12,500	368	48.6	532	46.6
12,501-15,000	247	29.1	303	30.4
15,001-17,500	106	14.2	175	17.1
17,501-20,000	52	8.1	69	18.8
20,001-over	19	10.5	26	11.5
Total	**2,203**	**59.4**	**2,955**	**58.8**
INLAND	53		57	
LAND	1,936		2,646	
OFFSHORE	214		252	

* Rigs employed under footage contracts.
Definitions, see OGJ 3/19/84, p. 138.
Source: Smith International Inc.
Data available in Oil & Gas Journal Energy Database.

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	1-25-85*	1-27-84†		1-25-85*	1-27-84†
Alabama	54	52	Montana	81	76
Alaska	1,750	1,752	New Mexico	218	204
California	1,127	1,112	North Dakota	142	139
Colorado	84	76	Oklahoma	460	447
Florida	35	42	Texas	2,432	2,528
Illinois	81	77	Utah	89	76
Kansas	210	194	Wyoming	326	299
Louisiana	1,401	1,386	All others	181	168
Michigan	83	81			
Mississippi	90	89	Total	8.844	8.798

*OGJ estimate †Revised

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	2-22-85*	2-24-84†		2-22-85*	2-24-84†
Alabama	57	54	Montana	80	76
Alaska	1,771	1,749	New Mexico	220	214
California	1,135	1,113	North Dakota	143	142
Colorado	80	77	Oklahoma	455	485
Florida	37	42	Texas	2,435	2,494
Illinois	83	71	Utah	89	77
Kansas	213	208	Wyoming	325	320
Louisiana	1,415	1,395	All others	181	175
Michigan	84	81			
Mississippi	89	94	Total	8.892	8.867

*OGJ estimate †Revised

Produced by Oil & Gas Journal Energy Database

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	3-29-85*	3-30-84†		3-29-85*	3-30-84†
Alabama	56	51	Montana	79	80
Alaska	1,772	1,570	New Mexico	217	216
California	1,145	1,115	North Dakota	142	144
Colorado	78	76	Oklahoma	452	440
Florida	36	40	Texas	2,429	2,499
Illinois	83	77	Utah	90	77
Kansas	211	191	Wyoming	323	307
Louisiana	1,413	1,374	All others	181	185
Michigan	84	68			
Mississippi	88	92	Total	8.879	8.602

*OGJ estimate †Revised
Produced by Oil & Gas Journal Energy Database

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	4-26-85*	4-27-84†		4-26-85*	4-27-84†
Alabama	[illegible]	[illegible]	Montana	[illegible]	[illegible]
Alaska	[illegible]	[illegible]	New Mexico	[illegible]	[illegible]
California	[illegible]	[illegible]	North Dakota	[illegible]	[illegible]
Colorado	[illegible]	[illegible]	Oklahoma	[illegible]	[illegible]
Florida	[illegible]	[illegible]	Texas	[illegible]	[illegible]
Illinois	[illegible]	[illegible]	Utah	[illegible]	88
Kansas	[illegible]	[illegible]	Wyoming	[illegible]	[illegible]
Louisiana	[illegible]	[illegible]	All others	181	181
Michigan	[illegible]	[illegible]			
Mississippi	[illegible]	[illegible]	Total	8,857	8,883

*OGJ estimate †Revised

Source: Oil & Gas Journal
Data available in Oil & Gas Journal Energy Database

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	5-31-85*	6-1-84†		5-31-85*	6-1-84†
Alabama	59	54	Montana	80	75
Alaska	1,766	1,658	New Mexico	212	214
California	1,145	1,129	North Dakota	141	143
Colorado	78	79	Oklahoma	443	454
Florida	37	38	Texas	2,424	2,477
Illinois	81	78	Utah	88	88
Kansas	204	216	Wyoming	330	327
Louisiana	1,423	1,423	Other States	180	185
Michigan	84	81			
Mississippi	87	90	Total	8,858	8,809

*OGJ estimate †Revised

Source: Oil & Gas Journal
Data available in Oil & Gas Journal Energy Database

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	6-28-85*	6-29-84†		6-28-85*	6-29-84†
Alabama	60	53	Montana	79	81
Alaska	1,795	1,764	New Mexico	212	214
California	1,131	1,103	North Dakota	142	145
Colorado	78	78	Oklahoma	438	467
Florida	33	38	Texas	2,419	2,471
Illinois	79	78	Utah	86	88
Kansas	204	213	Wyoming	333	327
Louisiana	1,425	1,417	Other States	180	185
Michigan	84	86			
Mississippi	84	[illegible]	Total	8,862	8,903

*OGJ estimate †Revised

Source: Oil & Gas Journal
Data available in Oil & Gas Journal Energy Database

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	7-26-85*	7-27-84†		7-26-85*	7-27-84†
Alabama	60	56	Montana	79	80
Alaska	1,795	1,688	New Mexico	212	215
California	1,135	1,120	North Dakota	142	146
Colorado	78	78	Oklahoma	441	468
Florida	33	38	Texas	2,419	2,460
Illinois	80	80	Utah	104	109
Kansas	204	205	Wyoming	335	366
Louisiana	1,425	1,413	All others	180	184
Michigan	84	82			
Mississippi	84	92	Total	8,891	8,880

*OGJ estimate †Revised

Source: Oil & Gas Journal
Data available in Oil & Gas Journal Energy Database

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	8-30-85*	8-31-84†		8-30-85*	8-31-84†
Alabama	59	54	Montana	80	79
Alaska	1,810	1,722	New Mexico	214	216
California	1,140	1,138	North Dakota	141	148
Colorado	78	76	Oklahoma	440	394
Florida	32	36	Texas	2,416	2,447
Illinois	80	82	Utah	106	104
Kansas	204	211	Wyoming	338	329
Louisiana	1,427	1,411	All others	180	190
Michigan	84	81			
Mississippi	83	91	Total	8,912	8,809

*OGJ estimate †Revised

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	9-27-85*	9-28-84†		9-27-85*	9-28-84†
Alabama	59	56	Montana	79	80
Alaska	1,808	1,761	New Mexico	213	216
California	1,147	1,132	North Dakota	140	144
Colorado	77	78	Oklahoma	444	509
Florida	32	39	Texas	2,415	2,460
Illinois	82	80	Utah	105	105
Kansas	202	201	Wyoming	338	350
Louisiana	1,425	1,424	All others	181	182
Michigan	84	86			
Mississippi	82	90	Total	8,913	8,993

*OGJ estimate †Revised

Source: Oil & Gas Journal
Data available in Oil & Gas Journal Energy Database

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	10-25-85*	10-26-84†		10-25-85*	10-26-84†
Alabama	60	54	Montana	79	84
Alaska	1,800	1,738	New Mexico	212	219
California	1,147	1,145	North Dakota	140	146
Colorado	77	78	Oklahoma	440	462
Florida	29	38	Texas	2,422	2,446
Illinois	82	84	Utah	106	103
Kansas	202	211	Wyoming	334	340
Louisiana	1,427	1,410	All others	181	192
Michigan	84	84			
Mississippi	85	88	Total	8,907	8,922

*OGJ estimate †Revised

Source: Oil & Gas Journal
Data available in Oil & Gas Journal Energy Database

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	11-29-85*	11-30-84†		11-29-85*	11-30-84†
Alabama	58	57	Montana	81	84
Alaska	1,790	1,781	New Mexico	212	222
California	1,148	[illegible]	North Dakota	140	143
Colorado	77	[illegible]	Oklahoma	435	476
Florida	29	38	Texas	2,422	2,456
Illinois	80	83	Utah	106	107
Kansas	200	211	Wyoming	334	336
Louisiana	1,430	1,408	Other States	182	188
Michigan	85	78			
Mississippi	85	88	Total	8,894	8,979

*OGJ estimate †Revised

Source: Oil & Gas Journal
Data available in Oil & Gas Journal Energy Database

OGJ production report

Crude oil and lease condensate
(1,000 b/d)

	12-20-85*	12-21-84†		12-20-85*	12-21-84†
Alabama	57	57	New Mexico	211	221
Alaska	1,784	1,735	North Dakota	140	143
California	1,149	1,133	Oklahoma	429	457
Colorado	77	78	Texas	2,418	2,460
Florida	28	37	Utah	106	103
Illinois	80	82	Wyoming	335	337
Kansas	200	207	All others	183	187
Louisiana	1,430	1,441			
Michigan	85	75	Total	8,877	8,918
Mississippi	85	81			
Montana	80	83			

*OGJ estimate †Revised

API refinery report—January 25, 1985

	Refinery operations (Thousands of barrels daily)					Refinery ouptut (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
District	**Total refinery input**	**Crude runs**	**Input to crude stills**	**Operable capacity**	**% operated**	**Total**	**Leaded***	**Unleaded***	**Naphtha**	**Kero**	**Distillate**	**Residual**
East coast	996	958	975	1,405	69.4	453	148	305	21	22	211	148
App. Dist. 1	90	87	87	115	75.7	29	13	16	—	—	24	6
Dist. 1 total	**1,086**	**1,045**	**1,062**	**1,520**	**69.9**	**482**	**161**	**321**	**21**	**22**	**235**	**154**
App. Dist. 2	55	50	50	66	75.8	26	9	17	—	—	14	4
Ind., Ill., Ky.	1,837	1,764	1,770	2,309	76.7	1,006	329	677	22	75	457	43
Minn., Wis., Dak.	284	266	277	303	91.4	145	64	81	4	5	81	11
Okla., Kan., Mo.	700	597	610	743	82.1	356	171	185	6	31	171	4
Dist. 2 total	**2,876**	**2,677**	**2,707**	**3,421**	**79.1**	**1,533**	**573**	**960**	**32**	**111**	**723**	**62**
Inland Texas	547	497	507	562	90.2	292	135	157	31	34	123	22
Texas Gulf Coast	3,082	2,773	2,815	3,760	74.9	1,272	339	933	30	186	613	246
La. Gulf Coast	1,862	1,812	1,828	2,535	72.1	795	226	569	14	210	428	117
N. La. and Ark.	177	169	175	293	59.7	57	19	38	8	—	51	9
New Mexico	56	52	53	75	70.7	31	17	14	8	2	10	—
Dist. 3 total	**5,724**	**5,303**	**5,378**	**7,225**	**74.4**	**2,447**	**736**	**1,711**	**91**	**432**	**1,225**	**394**
Dist. 4 total	**433**	**421**	**423**	**529**	**80.0**	**240**	**132**	**108**	**14**	**23**	**112**	**9**
Dist. 5 total	**2,301**	**2,144**	**2,144**	**3,051**	**70.3**	**1,029**	**342**	**687**	**44**	**290**	**337**	**332**
January 25, 1985	**12,420**	**11,590**	**11,714**	**15,746**	**74.4**	**5,731**	**1,944**	**3,787**	**202**	**878**	**2,632**	**951**
January 18, 1985†	**12,468**	**11,521**	**11,658**	**15,746**	**74.0**	**5,911**	**2,097**	**3,814**	**187**	**980**	**2,565**	**928**
January 27, 1984	**13,097**	**11,923**	**12,132**	**16,309**	**74.4**	**6,408**	**2,488**	**3,920**	**195**	**907**	**2,703**	**1,049**

*Included in total motor gasoline. †Revised.

API refinery report—February 22, 1985

	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
District	**Total refinery input**	**Crude runs**	**Input to crude stills**	**Operable capacity**	**% operated**	**Total**	**Leaded***	**Unleaded***	**Naphtha**	**Kero**	**Distillate**	**Residual**
East coast	1.127	1.011	1.037	1.405	73.8	524	159	365	18	49	236	183
App. Dist. 1	100	96	97	115	84.3	35	14	21	—	—	28	7
Dist. 1 total	**1.227**	**1.107**	**1.134**	**1.520**	**74.6**	**559**	**173**	**386**	**18**	**49**	**264**	**190**
App. Dist. 2	55	49	49	66	74.2	30	8	22	—	—	10	2
Ind., Ill., Ky.	1.733	1.622	1.622	2.309	70.2	1.049	340	709	14	85	337	51
Minn., Wis., Dak.	296	274	293	303	96.7	167	59	108	1	25	70	9
Okla., Kan., Mo.	618	554	562	743	75.6	392	182	210	3	32	143	6
Dist. 2 total	**2.702**	**2.499**	**2.526**	**3.421**	**73.8**	**1.638**	**589**	**1.049**	**18**	**142**	**560**	**68**
Inland Texas	549	486	486	562	86.5	270	108	162	31	37	118	39
Texas Gulf coast	3.105	2.727	2.782	3.550	78.4	1.295	328	967	33	238	583	251
La. Gulf Coast	2.113	1.970	2.000	2.620	76.3	982	309	673	26	270	422	135
N. La. and Ark.	180	170	170	293	58.0	56	19	37	9	—	52	6
New Mexico	54	50	50	75	66.7	35	16	19	8	3	11	—
Dist. 3 total	**6.001**	**5.403**	**5.488**	**7.100**	**77.3**	**2.638**	**780**	**1.858**	**107**	**548**	**1.186**	**431**
Dist. 4 total	**423**	**418**	**422**	**529**	**79.8**	**226**	**127**	**99**	**13**	**27**	**100**	**10**
Dist. 5 total	**2.118**	**2.060**	**2.066**	**3.051**	**67.8**	**895**	**308**	**587**	**38**	**252**	**336**	**440**
February 22, 1985	**12.471**	**11.487**	**11.638**	**15.621**	**74.5**	**5.956**	**1.977**	**3.979**	**194**	**1.018**	**2.446**	**1.139**
February 15, 1985†	**12.372**	**11.425**	**11.570**	**15.621**	**74.1**	**5.817**	**2.198**	**3.619**	**215**	**907**	**2.620**	**1.146**
February 24, 1984	**13.274**	**12.163**	**12.407**	**16.309**	**76.1**	**6.333**	**2.612**	**3.721**	**223**	**929**	**2.822**	**1.001**

*Included in total motor gasoline. †Revised.
Produced by Oil & Gas Journal Energy Database

API refinery report—March 29, 1985

	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
District	**Total refinery input**	**Crude runs**	**Input to crude stills**	**Operable capacity**	**% operated**	**Total**	**Leaded***	**Unleaded***	**Naphtha**	**Kero**	**Distillate**	**Residual**
East coast	1.057	954	970	1.405	69.0	613	236	377	17	33	240	151
App. Dist. 1	108	102	102	115	88.7	43	16	27	—	—	30	4
Dist. 1 total	**1.165**	**1.056**	**1.072**	**1.520**	**70.5**	**656**	**252**	**404**	**17**	**33**	**270**	**155**
App. Dist. 2	66	60	60	66	90.9	37	14	23	2	—	12	1
Ind., Ill., Ky.	1.682	1.545	1.558	2.309	67.5	933	331	602	23	72	260	76
Minn., Wis., Dak.	289	275	286	303	94.4	160	58	102	2	15	59	10
Okla., Kan., Mo.	601	581	588	743	79.1	351	179	172	8	27	138	8
Dist. 2 total	**2.638**	**2.461**	**2.492**	**3.421**	**72.8**	**1.481**	**582**	**899**	**35**	**114**	**469**	**95**
Inland Texas	528	471	472	562	84.0	278	134	144	25	29	104	19
Texas Gulf coast	2.875	2.500	2.536	3.550	71.4	1.428	531	897	14	237	559	216
La. Gulf Coast	2.200	2.078	2.105	2.620	80.3	999	318	681	24	247	432	116
N. La. and Ark.	182	172	172	293	58.7	53	22	31	10	—	47	5
New Mexico	58	53	54	75	72.0	34	15	19	11	1	8	—
Dist. 3 total	**5.843**	**5.274**	**5.339**	**7.100**	**75.2**	**2.792**	**1.020**	**1.772**	**84**	**514**	**1.150**	**356**
Dist. 4 total	**446**	**416**	**418**	**529**	**79.0**	**243**	**143**	**100**	**13**	**26**	**110**	**9**
Dist. 5 total	**2.395**	**2.260**	**2.284**	**3.051**	**74.9**	**1.044**	**333**	**711**	**88**	**248**	**360**	**468**
March 29, 1985	**12.487**	**11.467**	**11.605**	**15.621**	**74.3**	**6.216**	**2.330**	**3.886**	**237**	**935**	**2.359**	**1.083**
March 22, 1985†	**12.302**	**11.386**	**11.544**	**15.621**	**73.9**	**6.019**	**2.124**	**3.895**	**222**	**1.004**	**2.238**	**1.002**
March 30, 1984	**12.934**	**11.996**	**12.222**	**16.309**	**74.9**	**6.362**	**2.616**	**3.746**	**227**	**874**	**2.360**	**815**

*Included in total motor gasoline. †Revised.
Produced by Oil & Gas Journal Energy Database

API refinery report—July 26, 1985

	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
District	Total refinery input	Crude runs	Input to crude stills	Operable capacity	% operated	Total	Leaded*	Unleaded*	Naphtha	Kero	Distillate	Residual
East coast	1,181	1,057	1,066	1,487	71.7	544	109	435	26	54	257	143
App. Dist. 1	138	128	128	114	112.3	42	13	29	—	—	34	3
Dist. 1 total........	**1,319**	**1,185**	**1,194**	**1,601**	**74.6**	**586**	**122**	**464**	**26**	**54**	**291**	**146**
App. Dist. 2	59	55	55	66	83.3	25	12	13	2	—	14	1
Ind., Ill., Ky.	1,976	1,864	1,892	2,175	87.0	1,130	387	743	19	116	363	55
Minn., Wis., Dak.	308	291	291	301	96.7	177	82	95	2	26	59	7
Okla., Kan., Mo.	759	649	661	714	92.6	364	163	201	8	29	175	28
Dist. 2 total........	**3,102**	**2,859**	**2,899**	**3,256**	**89.0**	**1,696**	**644**	**1,052**	**31**	**171**	**611**	**91**
Inland Texas	556	486	505	547	92.3	298	124	174	25	25	117	18
Texas Gulf coast	3,248	2,732	2,826	3,706	76.3	1,741	661	1,080	37	187	603	133
La. Gulf Coast	2,272	2,103	2,137	2,617	81.7	1,099	393	706	16	189	456	84
N. La. and Ark.	187	179	179	256	69.9	53	18	35	5	—	49	8
New Mexico	67	63	63	68	92.6	46	17	29	9	1	15	—
Dist. 3 total........	**6,330**	**5,563**	**5,710**	**7,194**	**79.4**	**3,237**	**1,213**	**2,024**	**92**	**402**	**1,240**	**243**
Dist. 4 total........	**449**	**441**	**447**	**575**	**77.7**	**214**	**106**	**108**	**12**	**23**	**115**	**12**
Dist. 5 total........	**2,469**	**2,404**	**2,436**	**2,993**	**81.4**	**1,112**	**387**	**725**	**52**	**284**	**396**	**301**
July 26, 1985	**13,669**	**12,452**	**12,686**	**15,619**	**81.2**	**6,845**	**2,472**	**4,373**	**213**	**934**	**2,653**	**793**
July 19, 1985†	**13,676**	**12,516**	**12,706**	**15,619**	**81.3**	**6,826**	**2,257**	**4,569**	**220**	**1,021**	**2,632**	**676**
July 27, 1984	**13,031**	**12,193**	**12,415**	**16,074**	**77.2**	**6,520**	**2,531**	**3,989**	**204**	**904**	**2,769**	**816**

*Included in total motor gasoline. †Revised

Source: American Petroleum Institute

Data available in Oil & Gas Journal Energy Database

API refinery report—August 23, 1985

	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
District	Total refinery input	Crude runs	Input to crude stills	Operable capacity	% operated	Total	Leaded*	Unleaded*	Naphtha	Kero	Distillate	Residual
East coast	1,215	1,097	1,101	1,487	74.0	593	160	433	22	55	284	141
App. Dist. 1	110	103	103	114	90.4	39	18	21	—	5	27	2
Dist. 1 total........	**1,325**	**1,200**	**1,204**	**1,601**	**75.2**	**632**	**178**	**454**	**22**	**60**	**311**	**143**
App. Dist. 2	60	57	57	66	86.4	33	13	20	4	—	14	1
Ind., Ill., Ky.	2,159	1,933	1,947	2,175	89.5	1,176	349	827	28	119	360	62
Minn., Wis., Dak.	329	301	301	301	100.0	164	67	97	6	20	69	6
Okla., Kan., Mo.	734	663	666	714	93.3	402	222	180	6	43	182	6
Dist. 2 total........	**3,282**	**2,954**	**2,971**	**3,256**	**91.2**	**1,775**	**651**	**1,124**	**44**	**182**	**625**	**75**
Inland Texas	553	483	486	547	88.8	293	125	168	25	29	119	17
Texas Gulf coast	3,146	2,722	2,812	3,706	75.9	1,636	741	895	22	218	522	136
La. Gulf Coast	2,108	1,845	1,863	2,617	71.2	1,086	363	723	19	230	375	95
N. La. and Ark.	163	153	153	256	59.8	46	25	20	4	—	48	9
New Mexico	64	59	61	68	89.7	45	19	27	9	1	16	—
Dist. 3 total........	**6,034**	**5,262**	**5,375**	**7,194**	**74.7**	**3,106**	**1,273**	**1,833**	**79**	**478**	**1,080**	**257**
Dist. 4 total........	**486**	**473**	**476**	**575**	**82.8**	**246**	**120**	**126**	**11**	**28**	**117**	**11**
Dist. 5 total........	**2,298**	**2,225**	**2,244**	**2,993**	**75.0**	**1,067**	**369**	**698**	**47**	**247**	**370**	**340**
August 23, 1985	**13,425**	**12,114**	**12,270**	**15,619**	**78.6**	**6,826**	**2,591**	**4,235**	**203**	**995**	**2,503**	**826**
August 16, 1985†	**13,452**	**12,150**	**12,300**	**15,619**	**78.8**	**6,749**	**2,407**	**4,342**	**231**	**954**	**2,590**	**848**
August 24, 1984	**13,526**	**12,430**	**12,581**	**16,074**	**76.3**	**6,288**	**2,396**	**3,892**	**260**	**1,004**	**2,678**	**813**

*Included in total motor gasoline. †Revised

Source: American Petroleum Institute

Data available in Oil & Gas Journal Energy Database

API refinery report—September 27, 1985

	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
District	Total refinery input	Crude runs	Input to crude stills	Operable capacity	% operated	Total	Leaded*	Unleaded*	Naphtha	Kero	Distillate	Residual
East coast	1,179	1,090	1,092	1,487	73.4	598	144	454	9	50	279	131
App. Dist. 1	108	97	97	114	85.1	39	19	20	—	—	32	2
Dist. 1 total........	**1,287**	**1,187**	**1,189**	**1,601**	**74.3**	**637**	**163**	**474**	**9**	**50**	**311**	**133**
App. Dist. 2	66	64	64	66	97.0	36	15	21	2	—	18	4
Ind., Ill., Ky.	2,114	1,872	1,885	2,175	86.7	1,082	286	796	17	117	395	69
Minn., Wis., Dak.	304	286	287	301	95.3	144	53	91	5	8	63	1
Okla., Kan., Mo.	603	544	544	714	76.2	358	189	169	6	15	155	4
Dist. 2 total........	**3,087**	**2,766**	**2,780**	**3,256**	**85.4**	**1,620**	**543**	**1,077**	**30**	**140**	**631**	**78**
Inland Texas	569	492	497	547	90.9	307	124	183	20	29	123	21
Texas Gulf coast	3,171	2,766	2,855	3,706	77.0	1,611	606	1,005	24	275	637	89
La. Gulf Coast	2,182	2,017	2,024	2,617	77.3	925	240	685	19	268	396	105
N. La. and Ark.	155	151	151	256	59.0	36	13	23	4	—	46	9
New Mexico	59	59	59	68	86.8	36	16	20	9	1	15	—
Dist. 3 total........	**6,136**	**5,485**	**5,586**	**7,194**	**77.6**	**2,915**	**999**	**1,916**	**76**	**573**	**1,217**	**224**
Dist. 4 total........	**467**	**452**	**453**	**575**	**78.8**	**230**	**120**	**110**	**13**	**6**	**117**	**12**
Dist. 5 total........	**2,348**	**2,338**	**2,348**	**2,993**	**78.4**	**1,060**	**333**	**727**	**55**	**229**	**427**	**352**
September 27, 1985	**13,325**	**12,228**	**12,356**	**15,619**	**79.1**	**6,462**	**2,158**	**4,304**	**183**	**998**	**2,703**	**799**
September 20, 1985†	**13,560**	**12,099**	**12,258**	**15,619**	**78.5**	**6,305**	**2,165**	**4,140**	**190**	**1,056**	**2,571**	**879**
September 28, 1984	**13,563**	**12,366**	**12,475**	**16,074**	**77.6**	**6,692**	**2,476**	**4,216**	**242**	**872**	**2,745**	**940**

*Included in total motor gasoline. †Revised

Source: American Petroleum Institute

Data available in Oil & Gas Journal Energy Database

API refinery report—April 26, 1985

District	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
	Total refinery input	Crude runs	Input to crude stills	Operable capacity	% operated	Total	Leaded*	Unleaded*	Naphtha	Kero	Distillate	Residual
East coast	1,104	1,065	1,068	1,405	76.0	738	290	448	29	23	256	181
App. Dist. 1	93	88	88	115	76.5	41	13	28	—	—	27	—
Dist. 1 total	**1,197**	**1,153**	**1,156**	**1,520**	**76.1**	**779**	**303**	**476**	**29**	**23**	**283**	**181**
App. Dist. 2	63	58	58	66	87.9	32	15	17	2	1	14	2
Ind., Ill., Ky.	1,720	1,681	1,699	2,285	74.4	938	308	630	20	76	310	48
Minn., Wis., Dak.	291	278	286	303	94.4	158	72	86	5	10	73	5
Okla., Kan., Mo.	677	559	566	718	78.8	382	207	175	9	22	154	15
Dist. 2 total	**2,751**	**2,576**	**2,609**	**3,372**	**77.4**	**1,510**	**602**	**908**	**36**	**109**	**551**	**70**
Inland Texas	476	390	415	561	74.0	276	122	154	30	34	104	18
Texas Gulf Coast	3,297	2,810	2,914	3,532	82.5	1,604	583	1,021	47	227	558	213
La. Gulf Coast	2,191	2,003	2,034	2,620	77.6	1,121	341	780	22	223	464	117
N. La. and Ark.	161	146	151	293	51.5	46	19	27	7	—	42	4
New Mexico	60	52	52	75	69.3	34	16	18	6	1	12	—
Dist. 3 total	**6,185**	**5,401**	**5,566**	**7,081**	**78.6**	**3,081**	**1,081**	**2,000**	**112**	**485**	**1,180**	**352**
Dist. 4 total	**336**	**298**	**300**	**529**	**56.7**	**207**	**103**	**104**	**8**	**17**	**95**	**8**
Dist. 5 total	**2,434**	**2,264**	**2,267**	**3,012**	**75.3**	**1,091**	**376**	**715**	**49**	**267**	**345**	**397**
April 26, 1985	**12,903**	**11,692**	**11,898**	**15,514**	**76.7**	**6,668**	**2,465**	**4,203**	**234**	**901**	**2,454**	**1,008**
April 19, 1985†	**12,759**	**11,793**	**11,912**	**15,514**	**76.8**	**6,457**	**2,318**	**4,149**	**245**	**916**	**2,474**	**930**
April 27, 1984	**13,288**	**12,047**	**12,461**	**16,270**	**76.6**	**6,905**	**2,842**	**4,063**	**193**	**907**	**2,413**	**861**

*Included in total motor gasoline. †Revised.
Source: American Petroleum Institute.
Data available in Oil & Gas Journal Energy Database.

API refinery report—May 31, 1985

District	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
	Total refinery input	Crude runs	Input to crude stills	Operable capacity	% operated	Total	Leaded*	Unleaded*	Naphtha	Kero	Distillate	Residual
East coast	1,197	1,074	1,080	1,405	76.9	488	127	361	17	54	241	102
App. Dist. 1	100	97	98	115	85.2	38	11	27	—	—	35	1
Dist. 1 total	**1,297**	**1,171**	**1,178**	**1,520**	**77.5**	**526**	**138**	**388**	**17**	**54**	**276**	**103**
App. Dist. 2	80	75	75	66	113.6	41	13	28	—	—	19	4
Ind., Ill., Ky.	1,994	1,838	1,849	2,285	80.9	1,047	435	612	23	55	399	30
Minn., Wis., Dak.	309	296	301	303	99.3	158	58	100	3	18	77	8
Okla., Kan., Mo.	707	633	641	718	89.3	390	186	204	7	8	194	8
Dist. 2 total	**3,090**	**2,842**	**2,866**	**3,372**	**85.0**	**1,636**	**692**	**944**	**33**	**81**	**689**	**50**
Inland Texas	469	436	452	561	80.6	284	121	163	23	27	117	23
Texas Gulf Coast	3,274	2,779	2,872	3,532	81.3	1,484	527	957	47	208	598	168
La. Gulf Coast	2,056	1,985	2,011	2,620	76.8	1,116	357	759	20	206	460	106
N. La. and Ark.	187	176	177	293	60.4	54	38	16	6	—	51	6
New Mexico	77	61	61	75	81.3	24	12	12	7	1	12	—
Dist. 3 total	**6,063**	**5,437**	**5,573**	**7,081**	**78.7**	**2,962**	**1,055**	**1,907**	**103**	**442**	**1,238**	**303**
Dist. 4 total	**480**	**459**	**466**	**529**	**88.1**	**249**	**112**	**137**	**14**	**20**	**131**	**9**
Dist. 5 total	**2,510**	**2,293**	**2,294**	**3,012**	**76.2**	**1,093**	**422**	**671**	**28**	**271**	**374**	**318**
May 31, 1985	**13,440**	**12,202**	**12,377**	**15,514**	**79.8**	**6,466**	**2,419**	**4,047**	**195**	**868**	**2,708**	**783**
May 24, 1985†	**12,972**	**11,802**	**11,988**	**15,514**	**77.3**	**6,570**	**2,404**	**4,166**	**243**	**773**	**2,675**	**789**
June 1, 1984	**13,927**	**12,830**	**13,074**	**16,270**	**80.4**	**6,742**	**2,728**	**4,014**	**194**	**928**	**2,780**	**812**

*Included in total motor gasoline. †Revised.
Source: American Petroleum Institute.
Data available in Oil & Gas Journal Energy Database.

API refinery report—June 28, 1985

District	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
	Total refinery input	Crude runs	Input to crude stills	Operable capacity	% operated	Total	Leaded*	Unleaded*	Naphtha	Kero	Distillate	Residual
East coast	1,265	1,146	1,149	1,405	81.8	635	158	477	13	52	222	80
App. Dist. 1	132	130	130	115	113.0	42	15	27	—	—	34	2
Dist. 1 total	**1,397**	**1,276**	**1,279**	**1,520**	**84.1**	**677**	**173**	**504**	**13**	**52**	**256**	**82**
App. Dist. 2	41	35	35	66	53.0	16	11	5	—	—	7	—
Ind., Ill., Ky.	2,046	1,993	1,993	2,285	87.2	1,117	410	707	19	121	356	48
Minn., Wis., Dak.	308	293	295	303	97.4	160	51	109	8	9	90	5
Okla., Kan., Mo.	725	670	680	718	94.7	408	226	182	10	32	188	10
Dist. 2 total	**3,120**	**2,991**	**3,003**	**3,372**	**89.1**	**1,701**	**698**	**1,003**	**37**	**162**	**641**	**63**
Inland Texas	558	485	490	561	87.3	279	115	164	29	27	127	16
Texas Gulf Coast	3,242	2,662	2,744	3,532	77.7	1,718	797	921	47	215	535	139
La. Gulf Coast	2,172	2,042	2,046	2,620	78.1	1,085	266	819	15	224	379	95
N. La. and Ark.	179	173	173	293	59.0	75	49	26	5	—	54	6
New Mexico	69	63	63	75	84.0	39	15	24	10	1	12	—
Dist. 3 total	**6,220**	**5,425**	**5,516**	**7,081**	**77.9**	**3,196**	**1,242**	**1,954**	**106**	**467**	**1,107**	**256**
Dist. 4 total	**463**	**463**	**463**	**529**	**87.5**	**264**	**153**	**111**	**10**	**35**	**117**	**12**
Dist. 5 total	**2,396**	**2,285**	**2,320**	**3,012**	**77.0**	**1,102**	**402**	**700**	**53**	**260**	**381**	**277**
June 28, 1985	**13,596**	**12,440**	**12,581**	**15,514**	**81.1**	**6,940**	**2,668**	**4,272**	**219**	**976**	**2,502**	**690**
June 21, 1985†	**13,439**	**12,303**	**12,433**	**15,514**	**80.1**	**6,682**	**2,412**	**4,270**	**193**	**880**	**2,703**	**729**
June 29, 1984	**12,969**	**12,222**	**12,423**	**16,270**	**76.4**	**6,490**	**2,670**	**3,820**	**216**	**931**	**2,776**	**871**

*Included in total motor gasoline. †Revised.
Source: American Petroleum Institute.
Data available in Oil & Gas Journal Energy Database.

API refinery report—October 25, 1985

	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
District	Total refinery input	Crude runs	Input to crude stills	Operable capacity	% operated	Total	Leaded*	Unleaded*	Naphtha	Kero	Distillate	Residual
East coast	1,120	1,033	1,040	1,484	70.1	672	130	542	4	46	311	125
App. Dist. 1	117	109	109	114	95.6	30	15	15	—	—	28	1
Dist. 1 total	**1,237**	**1,142**	**1,149**	**1,598**	**71.9**	**702**	**145**	**557**	**4**	**46**	**339**	**126**
App. Dist. 2	67	65	65	66	98.5	39	12	27	2	—	19	3
Ind., Ill., Ky.	2,032	1,746	1,763	2,175	81.1	969	341	628	17	118	404	64
Minn., Wis., Dak.	304	296	296	301	98.3	163	64	99	6	9	77	7
Okla., Kan., Mo.	707	639	644	714	90.2	473	281	192	4	39	184	7
Dist. 2 total	**3,110**	**2,746**	**2,768**	**3,256**	**85.0**	**1,644**	**698**	**946**	**29**	**166**	**684**	**81**
Inland Texas	581	510	510	547	93.2	321	160	161	21	33	137	23
Texas Gulf Coast	3,194	2,886	2,965	3,706	80.0	1,560	558	1,002	27	236	721	154
La. Gulf Coast	2,157	2,104	2,110	2,617	80.6	1,009	305	704	20	274	482	143
N. La. and Ark.	202	193	193	256	75.4	56	22	34	5	—	57	11
New Mexico	80	64	64	68	94.1	42	18	24	8	3	14	—
Dist. 3 total	**6,214**	**5,757**	**5,842**	**7,194**	**81.2**	**2,988**	**1,063**	**1,925**	**81**	**546**	**1,411**	**331**
Dist. 4 total	**469**	**460**	**463**	**575**	**80.5**	**222**	**125**	**97**	**13**	**22**	**120**	**12**
Dist. 5 total	**2,545**	**2,337**	**2,337**	**3,015**	**77.5**	**1,013**	**364**	**649**	**38**	**246**	**454**	**347**
October 25, 1985	**13,575**	**12,442**	**12,559**	**15,638**	**80.3**	**6,569**	**2,395**	**4,174**	**165**	**1,026**	**3,008**	**897**
October 10, 1985†	**13,368**	**12,417**	**12,546**	**15,638**	**80.2**	**6,092**	**2,062**	**4,030**	**254**	**1,055**	**2,871**	**910**
October 26, 1984	**12,792**	**11,952**	**12,097**	**16,074**	**75.3**	**6,341**	**2,490**	**3,851**	**206**	**1,023**	**2,640**	**849**

*Included in total motor gasoline. †Revised
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API refinery report—November 29, 1985

	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
District	Total refinery input	Crude runs	Input to crude stills	Operable capacity	% operated	Total	Leaded*	Unleaded*	Naphtha	Kero	Distillate	Residual
East coast	1,192	1,062	1,063	1,484	71.6	550	166	384	10	49	285	128
App. Dist. 1	55	52	52	114	45.6	29	14	15	—	—	18	2
Dist. 1 total	**1,247**	**1,114**	**1,115**	**1,598**	**69.8**	**579**	**180**	**399**	**10**	**49**	**303**	**130**
App. Dist. 2	70	66	66	66	100.0	36	19	17	—	—	19	3
Ind., Ill., Ky.	2,189	1,888	1,896	2,175	87.2	1,135	345	790	15	90	500	106
Minn., Wis., Dak.	306	291	291	301	96.7	171	84	87	1	7	87	3
Okla., Kan., Mo.	694	651	651	714	91.2	401	178	223	1	38	186	5
Dist. 2 total	**3,259**	**2,896**	**2,904**	**3,256**	**89.2**	**1,743**	**626**	**1,117**	**17**	**135**	**792**	**117**
Inland Texas	574	492	496	547	90.7	341	171	170	30	26	133	21
Texas Gulf coast	3,512	3,048	3,182	3,706	85.9	1,635	554	1,081	54	249	841	178
La. Gulf Coast	2,299	2,039	2,053	2,617	78.4	954	244	710	—	260	575	116
N. La. and Ark.	193	178	179	256	69.9	52	21	31	5	—	63	11
New Mexico	85	65	65	68	95.6	38	16	22	10	2	14	—
Dist. 3 total	**6,663**	**5,822**	**5,975**	**7,194**	**83.1**	**3,020**	**1,006**	**2,014**	**99**	**537**	**1,626**	**326**
Dist. 4 total	**444**	**419**	**423**	**575**	**73.6**	**253**	**134**	**119**	**16**	**17**	**115**	**12**
Dist. 5 total	**2,513**	**2,295**	**2,295**	**3,015**	**76.1**	**948**	**337**	**611**	**53**	**272**	**464**	**378**
November 29, 1985	**14,126**	**12,546**	**12,712**	**15,638**	**81.3**	**6,543**	**2,283**	**4,260**	**195**	**1,010**	**3,300**	**963**
November 22, 1985†	**13,990**	**12,627**	**12,815**	**15,638**	**81.9**	**6,434**	**2,241**	**4,193**	**239**	**1,123**	**3,107**	**976**
November 30, 1984	**13,337**	**12,238**	**12,382**	**16,074**	**77.0**	**6,763**	**2,632**	**4,131**	**220**	**1,020**	**2,938**	**895**

*Included in total motor gasoline. †Revised
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API refinery report—December 13, 1985

	Refinery operations (Thousands of barrels daily)					Refinery output (Thousands of barrels daily)						
						Motor gasoline			Jet fuel		Fuel oils	
District	Total refinery input	Crude runs	Input to crude stills	Operable capacity	% operated	Total	Leaded*	Unleaded*	Naphtha	Kero	Distillate	Residual
East coast	1,216	1,075	1,091	1,484	73.5	621	151	470	16	49	273	141
App. Dist. 1	131	123	123	114	107.9	43	21	22	—	—	37	3
Dist. 1 total	**1,347**	**1,198**	**1,214**	**1,598**	**76.0**	**664**	**172**	**492**	**16**	**49**	**310**	**144**
App. Dist. 2	68	65	65	66	98.5	41	13	28	—	—	21	3
Ind., Ill., Ky.	1,848	1,714	1,731	2,175	79.6	1,048	305	743	12	103	410	98
Minn., Wis., Dak.	305	283	290	301	96.3	150	57	93	3	14	79	12
Okla., Kan., Mo.	691	650	656	714	91.9	402	218	184	—	34	205	6
Dist. 2 total	**2,912**	**2,718**	**2,742**	**3,256**	**84.2**	**1,641**	**593**	**1,048**	**15**	**151**	**715**	**119**
Inland Texas	569	461	518	547	94.7	311	143	168	32	33	105	25
Texas Gulf Coast	3,375	2,868	2,998	3,706	80.9	1,700	667	1,033	33	245	766	167
La. Gulf Coast	2,456	2,253	2,270	2,617	86.7	1,151	347	804	35	297	552	130
N. La. and Ark.	188	178	182	256	71.1	57	20	37	5	—	54	11
New Mexico	87	65	65	68	95.6	36	16	20	10	2	14	—
Dist. 3 total	**6,675**	**5,825**	**6,033**	**7,194**	**83.9**	**3,255**	**1,193**	**2,062**	**115**	**577**	**1,491**	**333**
Dist. 4 total	**442**	**423**	**426**	**575**	**74.1**	**216**	**115**	**101**	**15**	**23**	**113**	**10**
Dist. 5 total	**2,316**	**2,275**	**2,277**	**3,015**	**75.5**	**1,013**	**288**	**725**	**56**	**238**	**412**	**371**
December 13, 1985	**13,692**	**12,439**	**12,692**	**15,638**	**81.2**	**6,789**	**2,361**	**4,428**	**217**	**1,038**	**3,041**	**977**
December 6, 1985†	**13,821**	**12,627**	**12,791**	**15,638**	**81.8**	**6,392**	**2,222**	**4,170**	**166**	**1,138**	**3,157**	**988**
December 14, 1984	**12,980**	**11,870**	**12,045**	**16,074**	**74.9**	**6,535**	**2,437**	**4,098**	**274**	**925**	**2,696**	**942**

API crude and product stocks

(Thousands of barrels)

	Crude oil	Motor gasoline				Jet fuels		Fuel oils		Unfinished oils
		Total	Leaded†	Unleaded†	Blending Comp.†	Naphtha	Kerosine	Distillate	Residual	
PAD I	15,762	63,709	24,477	34,725	4,507	1,000	8,512	59,007	26,947	10,931
PAD II	74,033	71,794	32,379	31,894	7,521	1,342	8,500	44,347	3,472	16,080
PAD III	152,990	61,130	19,201	28,467	13,462	2,255	12,251	25,698	9,051	45,496
PAD IV	12,781	7,898	3,440	2,333	2,125	339	670	3,717	463	2,623
PAD I-IV	**255,566**	**204,531**	**79,497**	**97,419**	**27,615**	**4,936**	**29,933**	**132,769**	**39,933**	**75,130**
PAD V	79,996*	30,295	9,897	12,349	8,049	1,671	6,233	11,587	9,097	24,359
January 25, 1985	**335,562***	**234,826**	**89,394**	**109,768**	**35,664**	**6,607**	**36,166**	**144,356**	**49,030**	**99,489**
January 18, 1985§	**345,316**	**241,293**	**90,285**	**113,804**	**37,204**	**6,922**	**36,515**	**151,363**	**52,451**	**97,365**
January 27, 1984	**344,729**	**224,457**	**91,693**	**93,084**	**39,680**	**6,390**	**30,636**	**122,361**	**42,984**	**105,091**

*Includes 26,202 bbl. of Alaskan crude in transit by water. †Included in total motor gasoline. §Revised

---

API crude and product stocks

(Thousands of barrels)

	Crude oil	Motor gasoline				Jet fuels		Fuel oils		Unfinished oils
		Total	Leaded†	Unleaded†	Blending Comp.†	Naphtha	Kerosine	Distillate	Residual	
PAD I	14.326	58.262	21.819	32.383	4.060	864	7.083	49.311	20.928	10.958
PAD II	68.858	69.391	30.074	31.185	8.132	1.538	7.968	41.337	3,114	15.747
PAD III	137,002	60.145	18.294	27.060	14.791	1.944	12.780	22.594	10.551	45.963
PAD IV	13.292	7.929	3.287	2.430	2.212	357	709	3.523	960	2.375
PAD I-IV	**233.478**	**195.727**	**73.474**	**93.058**	**29.195**	**4.703**	**28.540**	**116.765**	**35.553**	**75.043**
PAD V	82.759*	31.250	10.010	12.684	8.556	1.670	6.124	10.675	10.380	25.428
February 22, 1985	**316,237***	**226,977**	**83,484**	**105,742**	**37,751**	**6,373**	**34,664**	**127,440**	**45,933**	**100,471**
February 15, 1985§	**315,840**	**231,112**	**86,759**	**106,693**	**37,660**	**6,796**	**34,332**	**132,989**	**47,462**	**100,174**
February 24, 1984	**335,860**	**236,308**	**96,339**	**97,433**	**42,536**	**6,184**	**32,791**	**131,107**	**50,453**	**104,868**

*Includes 25,901 bbl. of Alaskan crude in transit by water. †Included in total motor gasoline. §Revised.
Produced by Oil & Gas Journal Energy Database.

API crude and product stocks

(Thousands of barrels)

	Crude oil	Motor gasoline				Jet fuels		Fuel oils		Unfinished oils
		Total	Leaded†	Unleaded†	Blending Comp.†	Naphtha	Kerosine	Distillate	Residual	
PAD I	15.676	60.476	22.909	33.194	4.373	857	7.585	33.549	20,577	10.358
PAD II	69.535	65.195	28.812	29.741	6.642	1.485	8.031	32.315	3.905	17,026
PAD III	146.236	59.876	18.593	26.379	14.904	2.193	12.040	20.777	10,714	48.835
PAD IV	13.682	8,219	3.513	2.311	2.395	395	780	3.181	469	2.661
PAD I-IV	**245,129**	**193,766**	**73.827**	**91,625**	**28.314**	**4.930**	**28.436**	**89,822**	**35.665**	**78,880**
PAD V	92,152*	27,285	8.949	10,656	7.680	1.411	6.297	10.498	8.942	26.668
March 29, 1985	**337,281***	**221,051**	**82.776**	**102,281**	**35,994**	**6,341**	**34,733**	**100.320**	**44,607**	**105.548**
March 22, 1985§	**334,208**	**219,993**	**81.365**	**102.794**	**35,834**	**5.925**	**34.609**	**106.401**	**46.343**	**106.502**
March 30, 1984	**331,316**	**245,051**	**101,303**	**101,880**	**41.868**	**6,747**	**34,183**	**111.445**	**48,452**	**113,846**

*Includes 28,758 bbl. of Alaskan crude in transit by water. †Included in total motor gasoline. §Revised
Produced by Oil & Gas Journal Energy Database

API crude and product stocks

(Thousands of barrels)

	Crude oil	Motor gasoline				Jet fuels		Fuel oils		Unfinished oils
		Total	Leaded†	Unleaded†	Blending Comp †	Naphtha	Kerosine	Distillate	Residual	
PAD I	17.132	58.634	22.889	32.212	3.533	871	7.804	32.404	20.801	13.908
PAD II	70.350	61.539	26.084	28.440	7.015	1.509	7.968	28.393	3.642	19.629
PAD III	151.279	58.822	18.144	27.130	13.548	2.257	12.704	23.322	10.616	50.493
PAD IV	14.022	7.562	3.088	2.249	2.225	407	687	2.541	468	2.093
PAD I-IV	**252.783**	**186.557**	**70.205**	**90.031**	**26.321**	**5.044**	**29.163**	**86.660**	**35.527**	**86.123**
PAD V	89.292*	27.782	8.804	11.870	7.108	1.415	6.126	9.801	10.320	26.331
April 26, 1985	**342.075***	**214.339**	**79.009**	**101.901**	**33.429**	**6.459**	**35.289**	**96.461**	**45.847**	**112.454**
April 19, 1985§	**332.603**	**215.832**	**78.987**	**103.421**	**33.424**	**6.574**	**35.116**	**97.540**	**44.816**	**111.699**
April 27, 1984	**341.225**	**250.203**	**101.190**	**107.153**	**41.860**	**6.437**	**34.051**	**101.244**	**45.438**	**116.781**

*Includes 31,098 bbl. of Alaskan crude in transit by water. †Included in total motor gasoline. §Revised
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API crude and product stocks

(Thousands of barrels)

	Crude oil	Motor gasoline				Jet fuels		Fuel oils		Unfinished oils
		Total	Leaded†	Unleaded†	Blending Comp.†	Naphtha	Kerosine	Distillate	Residual	
PAD I	16,992	60,286	21,215	35,511	3,560	1,134	8,481	33,259	18,917	12,483
PAD II	74,180	55,858	23,474	26,138	6,246	1,384	7,251	30,918	3,741	19,835
PAD III	164,790	61,227	18,885	27,404	14,938	2,317	12,403	27,021	10,951	53,143
PAD IV	13,968	7,554	3,048	2,468	2,038	405	872	2,610	417	2,131
PAD I-IV	**269,930**	**184,925**	**66,622**	**91,521**	**26,782**	**5,240**	**29,007**	**93,808**	**34,026**	**87,592**
PAD V	85,677*	30,114	9,321	13,249	7,544	1,476	5,477	10,788	9,109	25,637
May 31, 1985	**355,607***	**215,039**	**75,943**	**104,770**	**34,326**	**6,716**	**34,484**	**104,596**	**43,135**	**113,229**
May 24, 1985§	**357,379**	**213,613**	**76,123**	**104,015**	**33,475**	**6,770**	**35,247**	**100,511**	**42,995**	**113,087**
June 1, 1984	**360,853**	**252,394**	**100,500**	**109,658**	**42,236**	**6,249**	**34,437**	**99,853**	**47,941**	**119,082**

*Includes 26,028 bbl. of Alaskan crude in transit by water. †Included in total motor gasoline. §Revised.
Source: American Petroleum Institute.
Data available in Oil & Gas Journal Energy Database

API crude and product stocks

(Thousands of barrels)

	Crude oil	Motor gasoline				Jet fuels		Fuel oils		Unfinished oils
		Total	Leaded†	Unleaded†	Blending Comp.†	Naphtha	Kerosine	Distillate	Residual	
PAD I	15,139	61,310	24,056	33,711	3,543	794	9,083	35,315	18,489	13,783
PAD II	70,749	59,407	24,791	27,663	6,953	1,305	7,937	32,202	3,712	18,887
PAD III	158,217	58,852	19,905	24,716	14,231	2,323	12,021	27,405	10,151	55,122
PAD IV	13,306	7,019	3,052	2,220	1,747	483	844	2,690	479	2,094
PAD I-IV	**257,411**	**186,588**	**71,804**	**88,310**	**26,474**	**4,905**	**29,885**	**97,612**	**32,831**	**89,886**
PAD V	85,342*	30,225	9,596	13,250	7,379	1,727	6,353	10,829	8,209	26,183
June 28, 1985	**342,753***	**216,813**	**81,400**	**101,560**	**33,853**	**6,632**	**36,238**	**108,441**	**41,040**	**116,069**
June 21, 1985§	**349,961**	**215,399**	**79,253**	**102,324**	**33,822**	**6,909**	**37,094**	**108,635**	**41,310**	**114,915**
June 29, 1984	**357,981**	**249,881**	**98,250**	**109,336**	**42,295**	**6,619**	**34,163**	**112,744**	**49,585**	**109,100**

*Includes 25,825 bbl. of Alaskan crude in transit by water. †Included in total motor gasoline. §Revised.
Source: American Petroleum Institute.
Data available in Oil & Gas Journal Energy Database

API crude and product stocks

(Thousands of barrels)

	Crude oil	Motor gasoline				Jet fuels		Fuel oils		Unfinished oils
		Total	Leaded†	Unleaded†	Blending Comp.†	Naphtha	Kerosine	Distillate	Residual	
PAD I	16,470	67,681	24,362	39,413	3,906	750	9,715	39,677	19,318	12,709
PAD II	68,316	61,105	25,014	29,698	6,393	1,420	7,570	33,221	4,274	18,825
PAD III	150,845	61,696	19,217	27,071	15,408	2,247	12,400	30,231	9,442	53,907
PAD IV	13,261	5,845	2,482	1,959	1,404	407	766	3,212	575	2,397
PAD I-IV	**248,892**	**196,327**	**71,075**	**98,141**	**27,111**	**4,824**	**30,451**	**106,341**	**33,609**	**87,838**
PAD V	77,864*	30,328	9,026	13,355	7,947	1,699	5,945	12,533	8,367	26,946
July 26, 1985	**326,756***	**226,655**	**80,101**	**111,496**	**35,058**	**6,523**	**36,396**	**118,874**	**41,976**	**114,784**
July 19, 1985§	**333,070**	**222,245**	**79,898**	**107,547**	**34,800**	**6,718**	**37,531**	**114,962**	**41,738**	**115,705**
July 27, 1984	**356,043**	**237,515**	**90,973**	**107,554**	**38,988**	**7,053**	**35,652**	**125,202**	**51,674**	**106,631**

*Includes 23,840 bbl. of Alaskan crude in transit by water. †Included in total motor gasoline. §Revised.
Source: American Petroleum Institute.
Data available in Oil & Gas Journal Energy Database

API crude and product stocks

(Thousands of barrels)

	Crude oil	Motor gasoline				Jet fuels		Fuel oils		Unfinished oils
		Total	Leaded†	Unleaded†	Blending Comp.†	Naphtha	Kerosine	Distillate	Residual	
PAD I	15,161	65,462	23,292	37,481	4,689	884	9,360	40,919	16,430	10,569
PAD II	67,035	63,634	25,773	31,590	6,271	1,475	7,744	33,274	3,815	16,623
PAD III	147,484	63,798	21,374	26,532	15,892	2,228	11,697	28,734	10,955	51,397
PAD IV	12,958	5,480	2,287	1,652	1,541	400	855	2,891	528	2,214
PAD I-IV	**242,638**	**198,374**	**72,726**	**97,255**	**28,393**	**4,987**	**29,656**	**105,818**	**31,728**	**80,803**
PAD V	77,693*	29,176	9,393	12,418	7,365	2,044	5,514	11,978	8,696	25,302
August 23, 1985	**320,331***	**227,550**	**82,119**	**109,673**	**35,758**	**7,031**	**35,170**	**117,796**	**40,424**	**106,105**
August 16, 1985§	**326,853**	**227,564**	**79,735**	**112,137**	**35,692**	**6,823**	**36,831**	**118,006**	**40,407**	**109,555**
August 24, 1984	**346,569**	**228,816**	**86,792**	**104,306**	**37,718**	**7,282**	**38,346**	**135,152**	**48,766**	**106,700**

*Includes 24,021 bbl. of Alaskan crude in transit by water. †Included in total motor gasoline. §Revised.
Source: American Petroleum Institute.
Data available in Oil & Gas Journal Energy Database

API crude and product stocks

(Thousands of barrels)

		Motor gasoline				Jet fuels		Fuel oils		
	Crude oil	**Total**	**Leaded†**	**Unleaded†**	**Blending Comp.†**	**Naphtha**	**Kerosine**	**Distillate**	**Residual**	**Unfinished oils**
PAD I	15,574	59,421	20,490	34,467	4,464	658	9,398	44,039	19,118	11,007
PAD II	64,939	67,765	27,468	33,138	7,159	1,432	7,904	34,337	3,321	16,389
PAD III	140,762	62,400	18,217	28,212	15,971	2,055	12,943	25,660	11,531	50,444
PAD IV	12,835	5,851	2,580	1,773	1,498	417	715	3,003	604	2,247
PAD I-IV	**234,110**	**195,437**	**68,755**	**97,590**	**29,092**	**4,562**	**30,960**	**107,039**	**34,574**	**80,087**
PAD V	79,835*	29,398	9,202	13,494	6,702	1,827	5,593	10,024	8,424	23,336
September 27, 1985	**313,945***	**224,835**	**77,957**	**111,084**	**35,794**	**6,389**	**36,553**	**117,063**	**42,998**	**103,423**
September 20, 1985§	**312,861**	**225,593**	**77,520**	**111,698**	**36,375**	**6,555**	**36,318**	**116,593**	**40,767**	**101,661**
September 28, 1984	**329,692**	**229,074**	**84,491**	**105,304**	**39,279**	**6,826**	**38,546**	**142,212**	**47,308**	**108,696**

*Includes 24,712 bbl. of Alaskan crude in transit by water †Included in total motor gasoline §Revised
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API crude and product stocks

(Thousands of barrels)

		Motor gasoline				Jet fuels		Fuel oils		
	Crude oil	**Total**	**Leaded†**	**Unleaded†**	**Blending Comp.†**	**Naphtha**	**Kerosine**	**Distillate**	**Residual**	**Unfinished oils**
PAD I	16,406	59,936	20,397	34,929	4,610	762	10,658	49,083	22,971	12,359
PAD II	67,750	59,422	23,734	29,044	6,644	1,382	7,817	31,639	3,477	17,787
PAD III	142,675	61,611	17,343	29,591	14,677	2,251	12,473	29,516	12,665	53,136
PAD IV	12,356	5,720	2,546	1,743	1,431	360	735	2,661	509	2,230
PAD I-IV	**239,187**	**186,689**	**64,020**	**95,307**	**27,362**	**4,755**	**31,683**	**112,899**	**39,622**	**85,512**
PAD V	82,481*	28,969	8,852	13,238	6,879	1,749	5,076	9,914	7,800	22,689
October 25, 1985	**321,668***	**215,658**	**72,872**	**108,545**	**34,241**	**6,504**	**36,759**	**122,813**	**47,422**	**108,201**
October 18, 1985§	**320,237**	**217,537**	**73,659**	**108,018**	**35,860**	**6,568**	**36,619**	**118,299**	**45,710**	**106,839**
October 26, 1984	**340,940**	**229,309**	**83,667**	**107,236**	**38,406**	**6,612**	**39,498**	**155,278**	**49,079**	**111,006**

*Includes 25,628 bbl. of Alaskan crude in transit by water †Included in total motor gasoline §Revised
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API crude and product stocks

(Thousands of barrels)

		Motor gasoline				Jet fuels		Fuel oils		
	Crude oil	**Total**	**Leaded†**	**Unleaded†**	**Blending Comp.†**	**Naphtha**	**Kerosine**	**Distillate**	**Residual**	**Unfinished oils**
PAD I	15,379	62,197	20,470	37,231	4,496	1,001	10,110	57,251	21,501	13,668
PAD II	67,777	58,498	22,989	28,392	7,117	1,294	8,602	33,355	3,499	17,381
PAD III	140,937	59,513	16,581	28,132	14,800	2,289	11,979	28,424	12,117	55,346
PAD IV	12,148	6,144	2,418	2,024	1,702	319	713	2,615	478	2,295
PAD I-IV	**236,241**	**186,352**	**62,458**	**95,779**	**28,115**	**4,903**	**31,404**	**121,645**	**37,595**	**88,690**
PAD V	76,778*	28,051	8,923	13,058	6,070	1,669	4,961	10,598	8,439	22,961
November 22, 1985	**313,019***	**214,403**	**71,381**	**108,837**	**34,185**	**6,572**	**36,365**	**132,243**	**46,034**	**111,651**
November 15, 1985§	**310,205**	**213,983**	**70,704**	**108,447**	**34,832**	**6,662**	**38,310**	**128,965**	**46,591**	**108,522**
November 23, 1984	**349,036**	**234,267**	**86,845**	**107,276**	**40,146**	**6,785**	**39,433**	**157,018**	**50,774**	**109,984**

*Includes 23,280 bbl. of Alaskan crude in transit by water †Included in total motor gasoline §Revised
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API crude and product stocks

(Thousands of barrels)

		Motor gasoline				Jet fuels		Fuel oils		
	Crude oil	**Total**	**Leaded†**	**Unleaded†**	**Blending Comp.†**	**Naphtha**	**Kerosine**	**Distillate**	**Residual**	**Unfinished oils**
PAD I	14,944	64,404	21,804	38,007	4,593	823	9,718	59,192	22,138	12,986
PAD II	66,167	58,397	23,207	28,608	6,582	1,083	8,720	35,733	3,597	17,674
PAD III	150,600	64,256	20,485	28,973	14,798	2,440	12,834	31,949	13,010	54,296
PAD IV	11,967	6,446	2,633	2,026	1,787	407	680	3,126	449	2,470
PAD I-IV	**243,678**	**193,503**	**68,129**	**97,614**	**27,760**	**4,753**	**31,952**	**130,000**	**39,194**	**87,426**
PAD V	74,845*	25,882	8,187	10,576	7,119	1,737	4,364	11,345	9,607	22,672
December 13, 1985	**318,523***	**219,385**	**76,316**	**108,190**	**34,879**	**6,490**	**36,316**	**141,345**	**48,801**	**110,098**
December 6, 1985§	**322,250**	**219,592**	**74,051**	**110,254**	**35,287**	**6,297**	**38,412**	**142,396**	**48,551**	**109,568**
December 14, 1984	**346,368**	**241,284**	**89,563**	**111,093**	**40,628**	**7,440**	**37,726**	**153,391**	**51,529**	**103,409**

*Includes 22,193 bbl. of Alaskan crude in transit by water †Included in total motor gasoline §Revised
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	1-25 1985	1-18* 1985	1-25 1985	1-18* 1985	1-25 1985	1-18* 1985	1-27 1984
Total motor gasoline	237	247	26	19	263	266	200
Leaded gasoline†	106	98	9	6	115	104	95
Unleaded gasoline†	131	149	17	13	148	162	105
Distillate§	185	228	5	4	190	232	234
Residual	583	397	8	19	591	416	945
Jet fuel-naphtha	15	—	—	—	15	—	—
Jet fuel-kerosine	36	58	6	—	42	58	89
LPG	279	274	12	5	291	279	213
Unfinished oils	172	286	—	6	172	292	345
Other	124	101	14	35	138	136	127
Total products	**1,631**	**1,591**	**71**	**88**	**1,702**	**1,679**	**2,153**
Canadian crude	166	280	9	—	175	280	338
Other foreign	1,518	1,982	132	23	1,650	2,005	2,374
Total crude	**1,684**	**2,262**	**141**	**23**	**1,825**	**2,285**	**2,712**
Total imports	**3,315**	**3,853**	**212**	**111**	**3,527**	**3,964**	**4,865**

*Revised. †Included in total motor gasoline. §Includes No. 4 fuel oil.

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	3-29 1985	3-22* 1985	3-29 1985	3-22* 1985	3-29 1985	3-22* 1985	3-30 1984
Total motor gasoline	411	334	26	15	437	349	375
Leaded gasoline†	237	141	5	3	242	144	134
Unleaded gasoline†	174	193	21	12	195	205	241
Distillate§	111	208	2	2	113	210	118
Residual	371	706	14	19	385	725	702
Jet fuel-naphtha	35	32	—	—	35	32	—
Jet fuel-kerosine	—	54	9	—	9	54	30
LPG	113	195	16	18	129	213	282
Unfinished oils	349	363	—	—	349	363	267
Other	300	148	41	20	341	168	21
Total products	**1,690**	**2,040**	**108**	**74**	**1,798**	**2,114**	**1,795**
Canadian crude	485	315	—	20	485	335	380
Other foreign	2,231	2,226	260	149	2,491	2,375	2,823
Total crude	**2,716**	**2,541**	**260**	**169**	**2,976**	**2,710**	**3,203**
Total imports	**4,406**	**4,581**	**368**	**243**	**4,774**	**4,824**	**4,998**

*Revised. †Included in total motor gasoline. §Includes No. 4 fuel oil.
Produced by Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	5-31 1985	5-24* 1985	5-31 1985	5-24* 1985	5-31 1985	5-24* 1985	6-1 1984
Total motor gasoline	647	277	89	65	736	342	446
Leaded gasoline†	194	75	37	16	231	91	292
Unleaded gasoline†	453	202	52	49	505	251	154
Distillate§	178	148	12	—	190	148	322
Residual	720	398	16	3	736	401	607
Jet fuel-naphtha	34	—	2	—	36	—	—
Jet fuel-kerosine	94	20	4	—	98	20	25
LPG	118	239	11	18	129	257	277
Unfinished oils	509	399	6	7	515	406	61
Other	145	285	45	31	190	316	209
Total products	**2,445**	**1,766**	**185**	**124**	**2,630**	**1,890**	**1,947**
Canadian crude	616	518	35	53	651	571	417
Other foreign	2,862	2,307	112	318	2,974	2,625	3,237
Total crude	**3,478**	**2,825**	**147**	**371**	**3,625**	**3,196**	**3,654**
Total imports	**5,923**	**4,591**	**332**	**495**	**6,255**	**5,086**	**5,601**

*Revised. †Included in total motor gasoline. §Includes No. 4 fuel oil.
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	2-22 1985	2-15* 1985	2-22 1985	2-15* 1985	2-22 1985	2-15* 1985	2-24 1984
Total motor gasoline	307	358	72	18	379	376	411
Leaded gasoline†	166	163	60	6	226	169	127
Unleaded gasoline†	141	195	12	12	153	207	284
Distillate§	205	249	6	11	211	260	564
Residual	656	622	10	10	666	632	934
Jet fuel-naphtha	—	—	—	—	—	—	39
Jet fuel-kerosine	22	3	—	—	22	3	70
LPG	196	182	20	16	216	198	226
Unfinished oils	165	162	—	—	165	162	164
Other	135	222	9	29	144	251	190
Total products	**1,686**	**1,798**	**117**	**84**	**1,803**	**1,882**	**2,598**
Canadian crude	305	163	53	23	358	186	274
Other foreign	2,011	1,093	165	70	2,176	1,163	3,064
Total crude	**2,316**	**1,256**	**218**	**93**	**2,534**	**1,349**	**3,338**
Total imports	**4,002**	**3,054**	**335**	**177**	**4,337**	**3,231**	**5,936**

*Revised. †Included in total motor gasoline. §Includes No. 4 fuel oil.
Produced by Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	4-26 1985	4-19* 1985	4-26 1985	4-19* 1985	4-26 1985	4-19* 1985	4-27 1984
Total motor gasoline	324	269	41	18	365	287	368
Leaded gasoline†	117	89	3	4	120	93	236
Unleaded gasoline†	207	180	38	14	245	194	132
Distillate§	252	386	9	5	261	391	175
Residual	442	174	8	7	450	181	671
Jet fuel-naphtha	—	—	—	—	—	—	64
Jet fuel-kerosine	19	—	—	—	19	—	53
LPG	151	119	14	14	165	133	234
Unfinished oils	235	314	3	5	238	319	143
Other	162	60	18	19	180	79	337
Total products	**1.585**	**1.322**	**93**	**68**	**1.678**	**1.390**	**2.045**
Canadian crude	358	561	—	—	358	561	379
Other foreign	2.865	2.654	391	194	3.256	2.848	3.219
Total crude	**3.223**	**3.215**	**391**	**194**	**3.614**	**3.409**	**3.598**
Total imports	**4.808**	**4.537**	**484**	**262**	**5.292**	**4.799**	**5.643**

*Revised. †Included in total motor gasoline. §Includes No. 4 fuel oil.
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	6-28 1985	6-21* 1985	6-28 1985	6-21* 1985	6-28 1985	6-21* 1985	6-29 1984
Total motor gasoline	605	276	66	45	671	321	240
Leaded gasoline†	240	124	26	19	266	143	135
Unleaded gasoline†	365	152	40	26	405	178	105
Distillate§	294	171	11	16	305	187	242
Residual	481	410	9	8	490	418	807
Jet fuel-naphtha	27	24	2	4	29	28	—
Jet fuel-kerosine	9	18	14	8	23	26	18
LPG	71	58	1	4	72	62	239
Unfinished oils	304	206	—	3	304	209	302
Other	214	313	8	50	222	363	293
Total products	**2,005**	**1,476**	**111**	**138**	**2,116**	**1,614**	**2,141**
Canadian crude	565	348	26	25	591	373	358
Other foreign	1,952	2,163	66	227	2,018	2,390	3,316
Total crude	**2.517**	**2.511**	**92**	**252**	**2.609**	**2.763**	**3,674**
Total imports	**4.522**	**3.987**	**203**	**390**	**4.725**	**4.377**	**5,815**

*Revised. †Included in total motor gasoline. §Includes No. 4 fuel oil.
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	7–26 1985	7–19* 1985	7–26 1985	7–19* 1985	7–26 1985	7–19* 1985	7–27 1984
Total motor gasoline	290	317	58	43	348	360	280
Leaded gasoline†	153	141	10	17	163	158	134
Unleaded gasoline†	137	176	48	26	185	202	146
Distillate§	65	69	9	8	74	77	296
Residual	544	434	5	9	549	443	789
Jet fuel-naphtha	5	7	2	—	7	7	—
Jet fuel-kerosine	—	29	—	6	—	35	19
LPG	160	243	3	4	163	247	156
Unfinished oils	237	230	—	—	237	230	308
Other	198	156	44	14	242	170	97
Total products	**1,499**	**1,485**	**121**	**84**	**1,620**	**1,569**	**1,945**
Canadian crude	453	420	35	36	488	456	188
Other foreign	2,402	2,659	33	235	2,435	2,894	2,827
Total crude	**2,855**	**3,079**	**68**	**271**	**2,923**	**3,350**	**3,015**
Total imports	**4,354**	**4,564**	**189**	**355**	**4,543**	**4,919**	**4,960**

*Revised †Included in total motor gasoline §Includes No. 4 fuel oil
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	9–27 1985	9–20* 1985	9–27 1985	9–20* 1985	9–27 1985	9–20* 1985	9–28 1984
Total motor gasoline	186	279	14	43	200	322	297
Leaded gasoline†	60	16	3	—	63	16	114
Unleaded gasoline†	126	263	11	43	137	306	183
Distillate§	166	64	8	9	174	73	287
Residual	514	600	15	9	529	609	596
Jet fuel-naphtha	11	8	—	—	11	8	—
Jet fuel-kerosine	27	5	17	3	44	8	—
LPG	63	203	6	6	69	209	150
Unfinished oils	107	264	—	—	107	264	63
Other	181	270	21	20	202	290	500
Total products	**1,255**	**1,693**	**81**	**90**	**1,336**	**1,783**	**1,893**
Canadian crude	423	578	—	14	423	592	224
Other foreign	2,786	2,340	47	177	2,833	2,517	3,258
Total crude	**3,209**	**2,918**	**47**	**191**	**3,256**	**3,109**	**3,482**
Total imports	**4,464**	**4,611**	**128**	**281**	**4,592**	**4,892**	**5,375**

*Revised †Included in total motor gasoline §Includes No. 4 fuel oil
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	11–29 1985	11–22* 1985	11–29 1985	11–22* 1985	11–29 1985	11–22* 1985	11–30 1984
Total motor gasoline	328	416	65	29	393	445	304
Leaded gasoline†	64	62	16	15	80	77	129
Unleaded gasoline†	264	354	49	14	313	368	175
Distillate§	309	376	12	10	321	386	316
Residual	700	363	14	4	714	367	563
Jet fuel-naphtha	—	6	—	—	—	6	50
Jet fuel-kerosine	40	61	16	10	56	71	4
LPG	149	146	2	8	151	154	352
Unfinished oils	409	534	6	5	415	539	189
Other	178	41	18	5	196	46	104
Total products	**2,113**	**1,943**	**133**	**71**	**2,246**	**2,014**	**1,882**
Canadian crude	445	488	7	—	452	488	329
Other foreign	1,896	3,390	156	21	2,052	3,411	3,367
Total crude	**2,341**	**3,878**	**163**	**21**	**2,504**	**3,899**	**3,696**
Total imports	**4,454**	**5,821**	**296**	**92**	**4,750**	**5,913**	**5,578**

*Revised †Included in total motor gasoline §Includes No. 4 fuel oil
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	8–23 1985	8–16* 1985	8–23 1985	8–16* 1985	8–23 1985	8–16* 1985	8–24 1984
Total motor gasoline	272	301	26	33	298	334	245
Leaded gasoline†	73	84	8	12	81	96	108
Unleaded gasoline†	199	217	18	21	217	238	137
Distillate§	191	85	16	5	207	90	254
Residual	307	433	16	6	323	439	498
Jet fuel-naphtha	26	7	—	—	26	7	25
Jet fuel-kerosine	11	—	4	4	15	4	19
LPG	239	129	12	8	251	137	222
Unfinished oils	431	345	4	—	435	345	183
Other	186	266	27	10	213	276	132
Total products	**1,663**	**1,566**	**105**	**66**	**1,768**	**1,632**	**1,578**
Canadian crude	201	379	12	7	213	386	256
Other foreign	2,674	2,487	42	413	2,716	2,900	3,434
Total crude	**2,875**	**2,866**	**54**	**420**	**2,929**	**3,286**	**3,690**
Total imports	**4,538**	**4,432**	**159**	**486**	**4,697**	**4,918**	**5,268**

*Revised †Included in total motor gasoline §Includes No. 4 fuel oil
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	10-25 1985	10-18* 1985	10-25 1985	10-18* 1985	10-25 1985	10-18* 1985	10-26 1984
Total motor gasoline	212	125	22	5	234	130	411
Leaded gasoline†	58	38	14	2	72	40	174
Unleaded gasoline†	154	87	8	3	162	90	237
Distillate§	227	180	9	3	236	183	485
Residual	628	452	15	5	643	457	433
Jet fuel-naphtha	6	61	—	—	6	61	—
Jet fuel-kerosine	—	4	8	—	8	4	100
LPG	158	86	8	8	166	94	106
Unfinished oils	261	176	2	—	263	176	148
Other	205	274	13	43	218	317	293
Total products	**1,697**	**1,358**	**77**	**64**	**1,774**	**1,422**	**1,976**
Canadian crude	636	394	8	—	644	394	238
Other foreign	2,787	3,086	185	50	2,972	3,136	4,312
Total crude	**3,423**	**3,480**	**193**	**50**	**3,616**	**3,530**	**4,550**
Total imports	**5,120**	**4,838**	**270**	**114**	**5,390**	**4,952**	**6,526**

*Revised †Included in total motor gasoline §Includes No. 4 fuel oil
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

API imports of crude and products

(Thousands of barrels daily)

	Districts 1-4		District 5		Total U.S.		
	12-13 1985	12-6* 1985	12-13 1985	12-6* 1985	12-13 1985	12-6* 1985	12-14 1984
Total motor gasoline	207	355	56	35	263	390	527
Leaded gasoline†	35	118	12	18	47	136	277
Unleaded gasoline†	172	237	44	17	216	254	250
Distillate§	281	269	7	11	288	280	199
Residual	690	272	12	9	702	281	711
Jet fuel-naphtha	—	5	—	—	—	5	32
Jet fuel-kerosine	35	34	8	8	43	42	33
LPG	200	177	5	5	205	182	202
Unfinished oils	275	320	4	5	279	325	101
Other	134	103	4	28	138	131	347
Total products	**1,822**	**1,535**	**96**	**101**	**1,918**	**1,636**	**2,152**
Canadian crude	548	588	12	7	560	595	293
Other foreign	2,749	3,750	163	95	2,912	3,845	2,672
Total crude	**3,297**	**4,338**	**175**	**102**	**3,472**	**4,440**	**2,965**
Total imports	**5,119**	**5,873**	**271**	**203**	**5,390**	**6,076**	**5,117**

*Revised †Included in total motor gasoline §Includes No. 4 fuel oil
Source: American Petroleum Institute
Data available in Oil & Gas Journal Energy Database

CONTENTS OF INDEX

Technical

Exploration 242
Drilling 243
Production 246
Gas Processing 248
Pipeline 249
Refining 251
Petrochemical 254

General

International 255
States 260
Industry Affairs 263
Government 268
Organizations 269
Point of View 269
Contributing Authors 269

Special Issues

Offshore Southern California Report .... January 14
Worldwide Pipeline Construction Survey .... January 21
Forecast/Review .... January 28
Microcomputer Report .... February 11
Capital Spending Survey .... February 25
Drilling Technology Report .... March 4
Exploration/Development U.S.A. .... March 11
Annual Refining Number .... March 18
Annual Petrochemical Number .... March 25
Annual Production Number .... April 1
Worldwide Construction Report April 22
Offshore Report .... May 6
Refining Technology Report .... May 27
Offshore Northern Europe Report June 10
Arctic Drilling/Development Technology .... June 24
Annual Gas Processing Number July 15
Midyear Forecast/Review .... July 29
North American Arctic Report .... August 5
Annual Pipeline Number .... August 19
Ethylene Report .... September 2
OGJ 400 Report .... September 9
Annual Drilling Issue .... September 23
Annual Geophysical Report .... October 7
Worldwide Catalyst Report .... October 14
Worldwide Construction Report October 21
Independent Operations .... October 28
Offshore Construction Report .... November 11
Annual API Issue .... November 18
Pipeline Economics Report .... November 25
Deepwater Technology Report .... December 2
Control Valve Report .... December 16
Worldwide Report .... December 30

Annual Index — 1985

EXPLORATION

WEEKLY FEATURE

Exploration/Drilling (Weekly Feature) by John C. McCaslin

	Date	Page
Improved economics prompt another look at France's Paris basin—Herbert L. Brewer	1-7	105
How South Atlantic rifting affects Brazilian oil reserves distribution—Peter Szatmari, Edson Milani, Marcos Lana, Joao Conceicao, and Antonio Lobo	1-14	107
Facies relationships, reservoir potential of Ohio Creek interval across the Piceance Creek basin—John C. Lorenz and Anne K. Rutledge	1-21	91
Union scores three ways with W. Va. find	1-28	157
Amoco stakes deep Denver basin wildcat	2-4	75
Microcomputer applications for control of novel acoustic direction sensing tool—S. I. Jardine, P. G. Harper, M. Bull, and D. M. Treherne	2-11	123
Oil, gas potential of Brazil's Pelotas basin—Samuel T. Pees and Patrick J.V. Delaney	2-18	117
New era seen possible for Ark-La-Tex area	2-25	121
Leasing reflects high hopes in Northwest	3-4	131
Texaco eyes potential of new Rockies area	3-11	145
Financial risk stymies hunt in Pennsylvania	3-18	163
Hydrocarbon generation—central and northern North Sea—M. L. Reeder and I. C. Scotchman	3-25	137
Petroleum potential of the Papuan basin—W. D. Stewart and E. F. Durkee	4-1	151
Oregon's Mist field drawing new interest	4-8	117
Minnelusa fever breaks out in the Rockies	4-15	81
Hardeman drilling moves into Oklahoma	4-22	133
Paleozoics targeted in Denver basin	4-29	117
Utah areas promise further success	5-6	237
Future of gas lies in conventional sources	5-13	133
Petroleum geology of the greater Altamont area, Uinta basin, Utah—Keith Clem	5-20	87
SE Pennsylvania hosts unusual wildcat	5-27	123
Gulf plans Tucumcari basin wildcat	6-3	85
Gas finds stir Michigan deep drilling hunt	6-10	163
Exxon and Chevron score in Mobile Bay	6-17	143
Texaco drilling deep Big Horn flank test	6-24	113
New gas find heats up Tucumcari play	7-1	69
Operators hunt for oil in big gas province	7-8	67
CO_2, enhanced oil recovery in an 'new' Montana oil province: Sweetgrass arch—Dr. J. Henri N. Wennekers	7-15	147
Cretaceous province yields Paleozoic find	7-22	121
Bass Islands trend draws drilling interest	7-29	161
Hunt intensifies near Oregon's Mist field	8-5	115
Holbrook basin area awaits drill bit	8-12	111
Wildcat to probe northern Paradox basin	8-19	141
Michigan reef wells finally go on stream	8-26	83
Champlin slates remote Colorado wildcat	9-9	179
Pre-Cretaceous Denver basin hunt grows	9-16	125
Look for more Brandons in Colorado	9-23	159
Dry Idaho continues to beckon drillers	9-30	67
Case study in seismic diffraction near a gulf coast salt dome—M. A. Dablain and [illegible] F. Linville	10-14	137
Black Warrior basin yields deep gas find	10-21	119
West Michigan basin draws deep gas hunt	10-28	139
Test raises hopes in Basin and Range area	11-4	109
Weber hunt stirs interest in NW Colorado	11-18	163
Operators cautiously continue Alberta play	12-16	127
Survey heightens prospects off Tasmania	12-23	63
Deep search still brisk in Michigan basin	12-30	161

COMPUTERS

	Date	Page
Microcomputer applications for control of novel acoustic direction sensing tool—S. I. Jardine, P. G. Harper, M. Bull, and D. M. Treherne	2-11	123
Exxon's field computer system—a seismic data acquisition system—R. N. Hart	9-30	76

COMPUTERS, Programs

	Date	Page
Hand-held programmable calculator still proves useful in exploration—Bruce A. Blake	10-14	146

COSTS

	Date	Page
Concession terms affect crude oil profitability—John Goff	7-29	176
Acquisition of information—economic considerations—Richard L. Ricks	9-30	68

FORECASTS, TRENDS, STATISTICS, SURVEYS

	Date	Page
Total wells drilled in the United States—September 1984	1-7	116
FORECAST/REVIEW. New giant fields in the U.S. await development	1-28	114
Total exploratory wells drilled in the United States—September 1984	1-28	172
Total wells drilled in the United States—November 1984	1-28	180
Total wells drilled in the United States—October 1984	2-4	81
Total exploratory wells drilled in the United States—November 1984	2-4	82
Total wells drilled in the United States—December 1984	2-18	136
Total exploratory wells drilled in the United States—December 1984	2-18	138
IEA spells out exploration target	3-4	52
Comment: Questions facing the independent operator—A. M. Schiemenz	3-4	146
EXPLORATION/DEVELOPMENT USA. Exploration/development activity due little change in U.S. this year	3-11	71
EXPLORATION/DEVELOPMENT USA. West Coast operators eye hard-to-extract oil reserves—Bob Williams	3-11	74
EXPLORATION/DEVELOPMENT USA. Two brisk Gulf of Mexico plays make area hottest in the U.S.—Rick Hagar	3-11	78
EXPLORATION/DEVELOPMENT USA. Rocky Mountain drilling action slips from higher 1984 levels—Bob Tippee	3-11	88
EXPLORATION/DEVELOPMENT USA. Midcontinent action tips toward development—G. Alan Petzet	3-11	94
EXPLORATION/DEVELOPMENT USA. Drilling steady throughout U.S. East, Southeast—John C. McCaslin	3-11	102
Total exploratory wells drilled in the United States—October 1984	3-11	161
Total wells drilled in the United States—1984	3-18	171
Total exploratory wells drilled in the United States—1984	3-18	172
N. California dry gas fields brighten 1984 hunt—Ron Leineke	4-15	88
API monthly well completions—Jan. and Feb. 1985	4-22	138
API monthly well completions—Mar. 1985	5-27	129
Distribution of world oil resources—Stephen Tanzil	6-3	86
U.S. exploration/production budgets trimmed	6-17	73
API monthly well completions—April 1985	6-17	152
Future oil discoveries of non-U.S. free world—L. F. Ivanhoe	6-24	120
Drilling deadline near for most pre-Flpma leases—Brian Wood	7-1	75
API monthly well completions—May 1985	7-22	134
Concession terms affect crude oil profitability—John Goff	7-29	176
API monthly well completions—June 1985	8-5	124
API monthly well completions—July 1985	9-9	192
API monthly well completions—August 1985	10-14	149
Resource depletion and Lower 48 oil and gas discovery rates—Thomas J. Woods	10-28	140
World well completions—1984	10-28	153
Potential of world's significant oil provinces—L. F. Ivanhoe	11-18	164
API monthly well completions—September 1985	11-18	170
API monthly well completions—October 1985	12-9	75
Video teleconferencing links exploration offices—Rick Hagar	12-23	64
World wildcat completions—1984	12-23	65
The Chinese onshore exploration agreements—Charlie Kirkwood	12-30	162
Chinese oil production through 1990—Charlie Kirkwood	12-30	167

GEOLOGY

	Date	Page
Improved economics prompt another look at France's Paris basin—Herbert L. Brewer	1-7	105
Kaiparowits basin: an old frontier with new potential—Thomas R. Lyons and Scott Montgomery	1-7	112
How South Atlantic rifting affects Brazilian oil reserves distribution—Peter Szatmari, Edson Milani, Marcos Lana, Joao Conceicao, and Antonio Lobo	1-14	107
Sri Lanka needs more exploration—Roger R. Alahakkone	1-28	169
The geology of Oakvale field—Tim Moore	2-4	77
Benin hydrocarbon potential looks promising—Arid Elvsborg and Jaques Dalode	2-11	126
Oil, gas potential of Brazil's Pelotas basin—Samuel T. Pees and Patrick J. V. Delaney	2-18	117
History and geology of Malaysia's Tinggi field—J. B. Brami, Mohd Yusof Muhaiyuddin, and S. L. Rieb	2-18	127
Oil accumulation, production characteristics, targets for added recovery in Texas reservoirs—1—Noel Tyler, W. E. Galloway, C. M. Garrett Jr., and T. E. Ewing	2-25	123
Oil accumulation, production characteristics, targets for added recovery in Texas reservoirs—2—Noel Tyler, W. E. Galloway, C. M. Garrett Jr., and T. E. Ewing	3-4	133
Geology of Brazil's Atlantic margin basins—Modesto Victor Dauzacker, Hannfried Schaller, Augusto Canellas M. Castro Jr., and Murilo Marroquim de Souza	3-4	142
A hydrocarbon exploration crustal classification—D. R. Kingston, C. P. Dishroon, and P. A. Williams	3-11	146
Hydrocarbon generation—Central and northern North Sea—M. L. Reeder and I. C. Scotchman	3-25	137
Petroleum potential of the Papuan basin—W. D. Stewart and E. F. Durkee	4-1	151
Meeteetse field sparks search for more production in Wyoming's Bighorn basin—Roger G. Wolff and Robert W. Roy	4-8	118
Petroleum geology of Colombia's Llanos basin: a summary—Chuck McCollough and Earl Padfield	4-15	82
Ordovician stratigraphic hydrocarbon entrapment potential of Appalachia—Gerald J. Henderson and Carolyn M. Timm	4-29	118
Global basin classification system—D. R. Kingston, C. P. Dishroon, and P. A. Williams	5-6	238
Hydrocarbon plays, global basin classification—D. R. Kingston, C. P. Dishroon, and P. A. Williams	5-6	265

	Date	Page
Petroleum geology of the greater Altamont area, Uinta basin, Utah—Keith Clem	5-20	87
Tectonic and hydrocarbon maturation history in the Permian basin—Ralph L. Horak	5-27	124
Trenton limestone fracture reservoirs in Lee County, Southwest Virginia—Charles S. Bartlett Jr.	6-10	164
Shawneetown fault zone, Southeast Illinois: structure and petroleum possibilities—D. K. Lumm and W. J. Nelson	6-17	144
Study assesses region to be opened to exploration in China	7-1	34
Exploration and development—Gulf Coast Tertiary, 1983—William C. Eisenhardt and Harry T. Holzman	7-8	68
CO_2, enhanced oil recovery in an 'new' Montana oil province: Sweetgrass arch—Dr. J. Henri N. Wennekers	7-15	147
Hydrocarbon distribution: Ouachita overthrust belt—Philip A. Chenoweth	7-22	122
Growth faults bounding Albuquerque basin may have created hydrocarbon traps—Lee A. Woodward	7-22	131
Carpentaria basin: a regional analysis—I. R. Burgess	7-29	180
Evolution and petroleum geology of the Navarin basin, Bering Sea, Alaska—David A. Steffy, Ronald F. Turner, Gary C. Martin, and Tabe O. Flett	8-5	116
Washington and Oregon—Are there other rocks to explore?—F. Tom Ise	8-12	112
An overview of hydrocarbon production in Appalachian basin—a glance at the forest—Patrick J. Burns and Robert C. Claus	8-12	116
Amoco ignites new South Texas Jurassic play—Walter S. Light Jr.	8-19	142
The Columbia basin—1: Tectonic model for formation of Columbia basin: implications for oil, gas potential of North Central Oregon—Steven G. Fritts and Lanny H. Fisk	8-26	84
The Columbia basin—2: Structural evolution of south margin—relation to hydrocarbon generation—Steven G. Fritts and Lanny H. Fisk	9-2	85
The petroleum geology of the Republic of Guinea-Bissau—Michael A. Dumestre and Francisco F. Carvalho	9-9	180
Differential movement in salt rock—Malcolm K. Jenyon	9-30	73
The petroleum geology of Senegal—Michel A. Dumestre	10-28	146
Saba Bank petroleum geology, NE Caribbean—Jean-Marie Despretz, Thomas E. Daly, and Edward Robinson	11-4	112
Hydrocarbons in the northern Basin and Range, Nevada and Utah—Louis C. Bortz	11-11	117
San Juan sag: Cretaceous rocks in volcanic covered basin, South Central Colo.—Robbie Rice Gries	11-25	109
Eocene and Upper Cretaceous carbonate reservoirs in East Central Tunisia—W. F. Bishop	12-2	137
Petroleum potential of Offshore Guyana—Steve Lawrence and Peter Coster	12-9	67
Basic geochemical strategies for hydrocarbon exploration—Roger Sassen	12-16	128
Recent advancements in the resolution of Landsat imagery for geologic mapping—Ken M. Morgan, David G. Koger, David D. Lambert, and Steven Wilhelm	12-23	66
GEOPHYSICS		
Facies relationships, reservoir potential of Ohio Creek interval across the Piceance Creek basin—John C. Lorenz and Anne K. Rutledge	1-21	91
Microcomputer applications for control of novel acoustic direction sensing tool—S. I. Jardine, P. G. Harper, M. Bull, and D. M. Treherne	2-11	123
Norwegian firm claims first in 3D seismic survey	2-25	50
Comment: Political roadblocks pose threat to geophysical work—Gene Womack	3-11	51
Thin bed velocity resolution—S. H. Bickel and P. C. Luh	4-8	126
Radon decay product measurements in radiometric uranium exploration: implications for petroleum exploration—J. W. Card, K. Bell, G. M. Denham, and S. R. A. Shah	6-24	114
Sonic waveform logging: a new way to obtain subsurface geologic information—R. E. Hoard	7-1	70
ANNUAL GEOPHYSICAL REPORT: Seismic profile across the leading edge of the fold and thrust belt of SW Montana—David A. Lopez and Christopher Schmidt	10-7	71
ANNUAL GEOPHYSICAL REPORT: Conducting a large 3D land survey in a densely populated area—an East Texas case history—Barry Burt, Les Denham, and Javaid Durrani	10-7	77
ANNUAL GEOPHYSICAL REPORT: 3D marine systems—an exploration tool—T. D. Einarsson, G. M. Gilbert, R. G. McBeath, and J. I. Sanders	10-7	84
ANNUAL GEOPHYSICAL REPORT: High-performance 3D migration of seismic data—Richard W. Verm, Chris J. Wade, and James L. Mater	10-7	92
ANNUAL GEOPHYSICAL REPORT: Petroleum prospects in the northwest seaboard of Scotland—Tom Kilenyi and Bob Standley	10-7	100
ANNUAL GEOPHYSICAL REPORT: Delineation of salt masses using borehole seismics—Akkas Manzur	10-7	147
ANNUAL GEOPHYSICAL REPORT: Seismic velocity—1: The effects of compaction on moveout—T. W. May and S. H. Bickel	10-7	149
Case study in seismic diffraction near a gulf coast salt dome—M. A. Dablain and A. F. Linville	10-14	137
Seismic velocity—2: How compaction affects dipping beds—T. W. May and S. H. Bickel	10-14	142
Design of discrete bandpass filters for petroleum exploration—K. L. Peacock	10-21	121
METHODS AND TECHNIQUES		
Microcomputer applications for control of novel acoustic direction sensing tool—S. I. Jardine, P. G. Harper, M. Bull, and D. M. Treherne	2-11	123
Automation improves Arkla's petroleum mapping system—Ginger M. Juhl	2-18	132
Geochemical identification of resource potential—Joel J. Sigalove	3-18	164
Mapping techniques that pay—David A. Fontaine	3-25	146
Thin bed velocity resolution—S. H. Bickel and P. C. Luh	4-8	126
Global basin classification system—D. R. Kingston, C. P. Dishroon, and P. A. Williams	5-6	238
Offset panel: A powerful analytical tool—Thomas K. Fulton and K. Michele Darr	5-13	135
Global distribution of terrestrial organic matter: a possible guide in petroleum exploration—Joseph I. Nwachukwu	5-20	92
Radon decay product measurements in radiometric uranium exploration: implications for petroleum exploration—J. W. Card, K. Bell, G. M. Denham, and S. R. A. Shah	6-24	114
Sonic waveform logging: a new way to obtain subsurface geologic information—R. E. Hoard	7-1	70
Onshore exploration using the new geochemistry and geomorphology—Donald F. Saunders and Stephen A. Terry	9-16	126
Contemporary remote sensing for hydrocarbon exploration, development—with case histories—Allen M. Feder	9-23	160
ANNUAL GEOPHYSICAL REPORT: Conducting a large 3D land survey in a densely populated area—an East Texas case history—Barry Burt, Les Denham, and Javaid Durrani	10-7	77
ANNUAL GEOPHYSICAL REPORT: 3D marine systems—an exploration tool—T. D. Einarsson, G. M. Gilbert, R. G. McBeath, and J. I. Sanders	10-7	84
ANNUAL GEOPHYSICAL REPORT: High-performance 3D migration of seismic data—Richard W. Verm, Chris J. Wade, and James L. Mater	10-7	92
ANNUAL GEOPHYSICAL REPORT: Delineation of salt masses using borehole seismics—Akkas Manzur	10-7	147
ANNUAL GEOPHYSICAL REPORT: Seismic velocity—1: The effects of compaction on moveout—T. W. May and S. H. Bickel	10-7	149
Seismic velocity—2: How compaction affects dipping beds—T. W. May and S. H. Bickel	10-14	142
Design of discreet bandpass filters for petroleum exploration—K. L. Peacock	10-21	121
Research project targets volcanic rocks	11-18	170
Video teleconferencing links exploration offices—Rick Hagar	12-23	64
Recent advancements in the resolution of Landsat imagery for geologic mapping—Ken M. Morgan, David G. Koger, David D. Lambert, and Steven Wilhelm	12-23	66
OFFSHORE		
OFFSHORE SOUTHERN CALIFORNIA REPORT: Big finds spur push off California—Bob Williams	1-14	55
OFFSHORE SOUTHERN CALIFORNIA REPORT: Access problems cool exploration off California—Bob Williams	1-14	65
OFFSHORE SOUTHERN CALIFORNIA REPORT: Miocene Monterey remains major challenge—Bob Williams	1-14	70
Norwegian firm claims first in 3D seismic survey	2-25	50
Leasing, drilling in state and federal Alabama waters	4-22	134
OFFSHORE REPORT: Northern Gulf of Guinea shows promise—M. A. Dumestre	5-6	154
Future of gas lies in conventional sources—John C. McCaslin	5-13	133
NORTH AMERICAN ARCTIC REPORT: Alaskan exploration shifts to eastern Beaufort—Bob Williams	8-5	80
Evolution and petroleum geology of the Navarin basin, Bering Sea, Alaska—David A. Steffy, Ronald F. Turner, Gary C. Martin, and Tabe O. Flett	8-5	116
ANNUAL GEOPHYSICAL REPORT: 3D marine systems—an exploration tool—T. D. Einarsson, G. M. Gilbert, R. G. McBeath, and J. I. Sanders	10-7	84
DEEPWATER TECHNOLOGY REPORT: Deepwater activity in gulf—Rick Hagar	12-2	64
RESERVES		
How South Atlantic rifting affects Brazilian oil reserves distribution—Peter Szatmari, Edson Milani, Marcos Lana, Joao Conceicao, and Antonio Lobo	1-14	107
Canada adjusts frontier reserves estimates	5-13	68
Distribution of world oil resources—Stephen Tanzil	6-3	86
Future oil discoveries of non-U.S. free world—L. F. Ivanhoe	6-24	120
Change seen key to Indonesian oil outlook—Stephen Tanzil	7-29	162
Resource estimate falls for federal areas off the U.S.	8-5	42
Resource depletion and Lower 48 oil and gas discovery rates—Thomas J. Woods	10-28	140
Potential of world's significant oil provinces—L. F. Ivanhoe	11-18	164
Basic geochamical strategies for hydrocarbon exploration—Roger Sassen	12-16	128

DRILLING

ACTIVITY, AREA		
Loffland rigs draw contracts for operations in U.S., Canada	10-28	62

	Date	Page
BITS		
Water mud gives advantages with PCD bits—C. W. (Pete) de Boisblanc	4-1	134
Three-step bit selection can trim drilling costs—Neal Adams	6-17	118
Diamond-bit technology pushes hydraulic, rotation limits—H. C. Vennin	12-23	55
Diamonds are becoming more important to drilling technology—Rubin Feenstra	12-30	131
BLOWOUTS, DISASTERS, FIRES, WILD WELLS		
Offshore platform fires and explosion analyzed	4-15	72
Water sprays suppress gas-well blowout fires—David Evans and Dwight Pfenning	4-29	80
No blame assigned in 1983 blowout off Texas	5-13	68
Case history of Texas' largest blowout shows successful techniques on deepest relief well—Robert D. Grace	5-20	68
Leaks cause two rig fires	8-5	100
Severe storm topples rig in Canadian Beaufort	9-30	22
Blowout hits test in Norwegian Sea	10-14	46
Gulf of Mexico hurricane sinks jack up, platform	11-4	52
Relief well drilling for blowout in North Texas—G. Alan Petzet	12-9	22
Gulf of Mexico gas/condensate well blows out	12-16	53
Sun prepares to drill second relief well in gulf	12-30	51
CALCULATOR/COMPUTER PROGRAMS		
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT. Computer program uses simulation method to help manage weather-sensitive projects—Henry Chen	6-24	80
Program calculates frac gradients for many basins—J. C. Matthews and W. R. Matthews	7-8	39
CASING		
Khuff drilling—1: ADCO improves deep Khuff drilling—F. A. Samhouri and A. M. Al-Chalabi	1-7	73
Tests find hammering, fluid cutting, erosion cause float shoe failures—Bill Stringfellow	1-21	66
CEMENTING		
Tests find hammering, fluid cutting, erosion cause float shoe failures—Bill Stringfellow	1-21	66
API work group reports field tests of geothermal cements	2-11	93
Planning would boost liner cementing success—Kyle S. Graves	4-15	47
How to avoid myths of squeeze cementing—Paul L. Crenshaw	4-22	93
Attention to primary cementing practices leads to better jobs—B. B. Bradford	10-21	59
COMPLETIONS, GENERAL AND MULTIPLE (Also see Production)		
Khuff drilling—1: ADCO improves deep Khuff drilling—F. A. Samhouri and A. M. Al-Chalabi	1-7	73
Mathematical algorithm aids analysis of "U-tubing" during slurry placement—Mark Wahlmeier and Simon Lam	1-7	80
How to handle abnormal pressures in Nigeria's Niger Delta area—Mark J. Ichara and Akpo A. Avbovbo	3-11	122
OFFSHORE REPORT. Gelled oil gravel pack improves well flow—Jean-Pierre Delos	5-6	125
Program calculates frac gradients for many basins—J. C. Matthews and W. R. Matthews	7-8	39
Sohio task group finds better completion techniques for Anadarko basin gas wells—C. C. Clement, S. F. Maness, and C. M. Mason	8-26	71
COMPUTERS/MICROCOMPUTERS		
MICROCOMPUTER REPORT. Microcomputers aid investment decisions—Suresh B. Pahwa, James E. Campbell, Robert C. MacDonald, and William H. Statham	2-11	63
Data-acquisition system cuts drilling costs—Tom Guidry	8-5	101
Transmitting drilling data rig to office—K. O. Taylor	8-12	80
Apple system adapted for mud logging—Mike Morris and Tom Kendrick	9-2	72
Microcomputing for oilmen—1: Options in microcomputing growing for hardware, software, and communications—Reuven Hollo, Imran Khan, and Moe Merchant	9-16	107
ANNUAL DRILLING REPORT. Microcomputing for oilmen—2: Micros support decision-making, manage projects, do office work—Rueven Hollo, Imran Khan, and Moe Merchant	9-23	104
Microcomputing for oilmen—conclusion: Checklist eases transition to computer use—Reuven Hollo, Imran Khan, and Moe Merchant	10-7	116
Computer system controls mud during kick kill—D. R. Thompson and Larry Dunlap	11-25	92
DEEPWATER TECHNOLOGY REPORT. Computer speeds offshore well planning, rig scheduling—Jim Pittman	12-2	84
CONTRACTS		
Loffland rigs draw contracts for operations in U.S., Canada	10-28	62
CORING (for Core Analysis, see Production)		
U.S. superdeep core holes proposed—G. Alan Petzet	8-26	48
Core orientation—1: Controlling errors minimizes risk and cost in core orientation—Douglas C. Bleakly, David R. Van Alstine, and Duane R. Packer	12-2	103
Core orientation—conclusion: How to evaluate orientaton data, quality control—Douglas C. Bleakly, David R. Van Alstine, and Duane R. Packer	12-9	46
CORROSION		
Khuff drilling—Conclusion: Program overcomes heat, pressure, sour gas—F. A. Samhouri and A. M. Al-Chalabi	1-14	91
Tests find hammering, fluid cutting, erosion cause float shoe failures—Bill Stringfellow	1-21	66
Galling-resistant zinc/silicon/phosphate coating protects thread connections in hostile service—Kenneth W. Rizzi, Nicholas J. Spiliotis, and Keith F. Blurton	7-15	136
COSTS		
MICROCOMPUTER REPORT. Microcomputers aid investment decisions—Suresh B. Pahwa, James E. Campbell, Robert C. MacDonald, and William H. Statham	2-11	63
DRILLING TECHNOLOGY REPORT. Miniplatform accelerates production, saves expendable wells—Joseph W. Blandford, Richard Gutierrez, and Robert L. McRee	3-4	76
DRILLING TECHNOLOGY REPORT. Rig-site system allows water reuse, cuts cleanup costs—Dietmar Neidhardt	3-4	88
Slump in U.S. onshore drilling, completion costs seen at an end	4-29	41
Rebound seen in Gulf of Mexico drilling/completion costs	4-29	44
IPAA pinpoints decline in U.S. drilling costs	6-10	82
Three-step bit selection can trim drilling costs—Neal Adams	6-17	118
Data-acquisition system cuts drilling costs—Tom Guidry	8-5	101
Air-drilling practices in the Midcontinent and Rocky Mountain areas can yield big savings—J. S. Sheffield and J. J. Sitzman	9-9	133
Index shows drilling, completion cost decline	11-4	48
Industry survey pinpoints cost of U.S. wells in 1984	12-30	51
DEEP WELLS		
Khuff drilling—1: ADCO improves deep Khuff drilling—F. A. Samhouri and A. M. Al-Chalabi	1-7	73
Khuff drilling—Conclusion: Program overcomes heat, pressure, sour gas—F. A. Samhouri and A. M. Al-Chalabi	1-14	91
Chinese, U.S. crews drill deep slant hole	12-2	51
U.S.S.R. schedules more superdeep drilling	12-9	32
Deep drilling project hopes for funds	12-23	30
DIRECTIONAL, CROOKED-HOLE, WELL-BORE SURVEYS		
Formation MWD benefits evaluation and efficiency—Will Honeybourne	2-25	83
DRILLING TECHNOLOGY REPORT. Future measurement-while-drilling technology will focus on two levels—Will Honeybourne	3-4	71
DRILLING TECHNOLOGY REPORT. Study identifies Niger Delta log parameter, VSP trends—Mark J. Ichara and Akpo A. Avbovbo	3-4	94
Bechtel develops innovative method for horizontal drilling—Larry E. Pendleton and A. Behrooz Ramesh	5-27	95
Conventional tubulars can cut cost of drilling in horizontal holes—Don Holbert	6-3	68
Quantitative mud-logging system tracks upward gas migration from the pay zone—Robert H. Reitsema, F. A. Lindberg, and A. J. Kaltenback	10-28	116
Mud log finds erratic variation in gas composition from surface to reservoir—Robert H. Reitsema	11-4	81
Devonian shale due horizontal hole, multifracs	11-11	42
Chinese, U.S. crews drill deep slant hole	12-2	51
DRILL COLLARS		
Tool-joint thread redesign cuts stress, increases fatigue life—Frank Carlin and Donna Saunders	7-22	75
DRILL PIPE		
Protect threads while plastic-coating pipe—Charles J. Levesque	7-8	44
Galling-resistant zinc/silicon/phosphate coating protects thread connections in hostile service—Kenneth W. Rizzi, Nicholas J. Spiliotis, and Keith F. Blurton	7-15	136
Tool-joint thread redesign cuts stress, increases fatigue life—Frank Carlin and Donna Saunders	7-22	75
FLUIDS (MUD, AIR, GAS) PRACTICES, SYSTEMS		
Tests find hammering, fluid cutting, erosion cause float shoe failures—Bill Stringfellow	1-21	66
Mercuric method determines drilling-fluid chlorides—Brent Warren	1-28	130
DRILLING TECHNOLOGY REPORT. Rig-site system allows water reuse, cuts cleanup costs—Dietmar Neidhardt	3-4	88
Technique determines particle-size distribution in oil muds—Steven K. Watson and Richard Bertagnolli	3-18	146
Lignosulfonate copolymer stabilizes lime muds—John A. Neal, Jan M. L. Zdybak, and Wyburn G. Bannerman	3-25	118
Drilling cement with a polymer mud—Tom Venus and Dave Dorsey	4-1	128
Water mud gives advantages with PCD bits—C. W. (Pete) de Boisblanc	4-1	134
Mud strategy slows sensitive shale sloughing—D. A. Smalling	6-10	152
Evaluating mineral oils for low-toxicity muds—Jim Burton and Tom Ford	7-29	129
Sohio task group finds better completion techniques for Anadarko basin gas wells—C. C. Clement, S. F. Maness, and C. M. Mason	8-26	71
Apple system adapted for mud logging—Mike Morris and Tom Kendrick	9-2	72
Air-drilling practices in the Midcontinent and Rocky Mountain areas can yield big savings—J. S. Sheffield J. J. Sitzman	9-9	133
KOH lignosulfonate mud controls Laffan, Nahr Umr/Wasia shales off Abu Dhabi—Lindsay Fraser	10-14	124

	Date	Page
Completion-fluids weight range expanded—Tom Mondshine	11-18	145
Computer system controls mud during kick kill—D. R. Thompson and Larry Dunlap	11-25	92

FORECASTS, TRENDS, STATISTICS, SURVEYS

	Date	Page
FORECAST/REVIEW. Drilling recovery stalls in last half of 1984—John C. McCaslin	1-28	107
How to meet overseas content laws—Henry T. DeNero and Amir Mahini	2-4	68
Adoption of Treasury's tax plan would deal crippling blow to industry	2-18	41
Sii-DAC Drilling Activity: Second-most-productive drilling year stumbles with fourth-quarter droop in activity—Randy Hall	2-18	98
Orders for semisubmersibles pace offshore rig construction—Rick Hagar	3-25	41
End of U.S. gas bubble, drilling rebound seen	3-25	52
Model for U.S. land-rig efficiency aids forecasts—William J. Gresham	4-8	67
Slump in U.S. onshore drilling, completion costs seen at an end	4-29	41
Cities' Hugoton infill plan supported	4-29	52
OFFSHORE REPORT. Offshore drilling rebounds, prompts new construction—W. D. Moore III	5-6	103
OTA cites need for Arctic, deepwater drilling initiatives	5-13	58
Sii-DAC Drilling Activity: Deeper drilling boosts footage totals; well counts are flat—Jack Knowlton	5-13	117
Hughes chops U.S. drilling forecast	6-3	40
Possible recovery seen for drilling next year	6-3	45
IADC tally shows decline in rotary rig fleet size	6-10	84
Three nations accused of dumping OCTG	7-29	85
MIDYEAR FORECAST/REVIEW. U.S. due another drop in number of active rigs—John C. McCaslin	7-29	106
Mergers' effect on U.S. drilling activity at issue	8-12	52
Bankers Trust sees rebound in U.S. drilling after 1986	8-12	54
Sii-DAC Drilling Activity: Gains across Central U.S., deeper wells lift drilling totals—Jack Knowlton	8-19	116
ANNUAL DRILLING REPORT. Drilling faces fair year for wells and footage, only mediocre for rig demand—W. D. Moore III	9-23	71
ANNUAL DRILLING REPORT. Operator/contractor relationships—statements: Slump has caused new set of problems	9-23	76
ANNUAL DRILLING REPORT. Operator/contractor relationships—questions: Panel at conference names ways to improve relationships	9-23	96
Operator/contractor relationships—conclusion: Questioners press for specific operating advice	9-30	49
Uncertainties to keep lid on fourth quarter drilling in U.S.	10-7	41
Tax reform, FERC plans blamed for weak drilling activity	10-7	42
Forecasters see further slide for U.S. active rigs, rig fleet	11-4	46
Index shows drilling, completion cost decline	11-4	48
Declining demand seen for rigs off Northwest Europe	11-11	28
Increase seen in oil field chemical use	11-11	34
Sii-DAC Drilling Activity: Footage, wells suffer biggest quarterly drop—Jack W. Knowlton	12-16	115
Industry survey pinpoints cost of U.S. wells in 1984	12-30	51
Diamonds are becoming more important to drilling technology	12-30	131
Drilling statistics influence most-appropriate risk technique—Robert H. Caldwell and Daniel Johnston	12-30	136

FUNDS

	Date	Page
Independent producers tapping new sources of capital—Marcia A. Parker	1-7	43
Public programs' 1984 sales show sharp drop	2-4	39
Public fund sales decline sharply in first half of 1985	8-5	40
Master limited partnerships set fund sale pace	10-28	59
INDEPENDENT OPERATIONS REPORT. Care required in raising funds from investors—David Kreuter	10-28	85
Deep drilling project hopes for funds	12-23	30

MAINTENANCE

	Date	Page
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT. Operating tips boost arctic diesel efficiency—William J. Gardner	6-24	73

MANAGEMENT

	Date	Page
Drilling deadline near for most pre-Flpma leases—Brian Wood	7-1	75
Transmitting drilling data rig to office—K. O. Taylor	8-12	80
How the contract drilling, service industries should plan to restructure—Matthew R. Simmons	11-11	95

OFFSHORE

	Date	Page
OFFSHORE SOUTHERN CALIFORNIA REPORT. Access problems cool exploration off California—Bob Williams	1-14	65
Sea trials prepare Sedco/BP rig for Ocean Drilling Program	1-21	38
DRILLING TECHNOLOGY REPORT. Miniplatform accelerates production, saves expendable wells—Joseph W. Blandford, Richard Gutierrez, and Robert L. McRee	3-4	76
Coast Guard may tighten offshore safety rules	3-18	66
Orders for semisubmersibles pace offshore rig construction—Rick Hagar	3-25	41
Offshore platform fires and explosion analyzed	4-15	72
OFFSHORE REPORT. Offshore drilling rebounds, prompts new construction—W. D. Moore III	5-6	103
OFFSHORE REPORT. Odeco upgrades stability requirement for new Odyssey class semis—Terry D. Petty	5-6	106
OFFSHORE REPORT. Diverter for deepwater drilling risers permits kick control—J. E. Hall and J. R. Roche	5-6	116
OFFSHORE REPORT. Gelled oil gravel pack improves well flow—Jean-Pierre Delos	5-6	125
OFFSHORE NORTHERN EUROPE REPORT. Oil development boom heats up off U. K.—Roger Vielvoye	6-10	92
OFFSHORE NORTHERN EUROPE REPORT. U.K. focus on domestic natural gas promises more brisk offshore activity—Roger Vielvoye	6-10	96
OFFSHORE NORTHERN EUROPE REPORT. Technology, terms keys to small producer work—Roger Vielvoye	6-10	122
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT. Odeco designs massive deepwater Arctic rig—Luc Chabot	6-24	59
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT. Bechtel studies subsea freezing behavior	6-24	72
Canmar's berm-supported SSDC drilling advances arctic technology—Kevin J. Hewitt, William E. Berzins, John P. Fitzpatrick, and Harry G. Hogeboom	7-1	39
Spray ice island technology advancing in Arctic—Bob Williams	9-2	28
DEEPWATER TECHNOLOGY REPORT. Well-control technique removes trapped gas from a subsea BOP—John M. Shaughnessy, Curtis W. Jackson, and Ronald D. Warren	12-2	55
DEEPWATER TECHNOLOGY REPORT. Deepwater activity in gulf—Rick Hagar	12-2	64
DEEPWATER TECHNOLOGY REPORT. Computer speeds offshore well planning, rig scheduling—Jim Pittman	12-2	84

PRACTICES

	Date	Page
DRILLING TECHNOLOGY REPORT. Rig-site system allows water reuse, cuts cleanup costs—Dietmar Neidhardt	3-4	88
How to handle abnormal pressures in Nigeria's Niger Delta area—Mark J. Ichara and Akpo A. Avbovbo	3-11	122
Mud strategy slows sensitive shale sloughing—D. A. Smalling	6-10	152
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT. Operating tips boost arctic diesel efficiency—William J. Gardner	6-24	73
Air-drilling practices in the Midcontinent and Rocky Mountain areas can yield big savings—J. S. Sheffield and J. J. Sitzman	9-9	133

RESEARCH

	Date	Page
Mathematical algorithm aids analysis of "U-tubing" during slurry placement—Mark Wahlmeier and Simon Lam	1-7	80
DRILLING TECHNOLOGY REPORT. Future measurement-while-drilling technology will focus on two levels—Will Honeybourne	3-4	71
U.S. superdeep core holes proposed—G. Alan Petzet	8-26	48
Spray ice island technology advancing in Arctic—Bob Williams	9-2	28
Devonian shale due horizontal hole, multifracs	11-11	42

RIGS (land, jack ups, drillships, barges, etc.)

	Date	Page
Sea trials prepare Sedco/BP rig for Ocean Drilling Program	1-21	38
Soviets christen first of two Arctic class jack up rigs	2-4	41
Heavy duty semi nearly ready for N. Sea assignment	3-11	46
Orders for semisubmersibles pace offshore rig construction—Rick Hagar	3-25	41
Model for U.S. land-rig efficiency aids forecasts—William J. Gresham	4-8	67
ONGC to place two more offshore rigs in operation	4-15	30
U.S.S.R. to expand fleet of Arctic class rigs	4-15	40
OFFSHORE REPORT. Odeco upgrades stability requirements for new Odyssey class semis—Terry D. Petty	5-6	106
Jack up due for 450 ft water depths	5-13	62
Soviet Union building third superheavy rig	5-20	50
Parker rigs get work in four countries	5-20	50
China buys five U.S. land rigs for Shengli field	5-27	38
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT. Odeco designs massive deepwater Arctic rig—Luc Chabot	6-24	59
Canmar's berm-supported SSDC drilling advances arctic technology—Kevin J. Hewitt, William E. Berzins, John P. Fitzpatrick, and Harry G. Hogeboom	7-1	39
Soviets to build jack ups at Vyborg	9-16	78
Submersible barge to work with SSDC in Beaufort Sea	10-21	30
Loffland rigs draw contracts for operations in U.S., Canada	10-28	62
Forecasters see further slide for U.S. active rigs, rig fleet	11-4	46
Gulf of Mexico hurricane sinks jack up, platform	11-4	52
Declining demand seen for rigs off Northwest Europe	11-11	28
Another Soviet Arctic jack up christened	11-25	36

SAFETY

	Date	Page
Coast Guard may tighten offshore safety rules	3-18	66
Offshore platform fires and explosion analyzed	4-15	72
Water sprays suppress gas-well blowout fires—David Evans and Dwight Pfenning	4-29	80
OFFSHORE REPORT. Diverter for deepwater drilling risers permits kick control—J. E. Hall and J. R. Roche	5-6	116
Leaks cause two rig fires	8-5	100
DEEPWATER TECHNOLOGY REPORT. Well-control technique removes trapped gas from a subsea BOP—John M. Shaughnessy, Curtis W. Jackson, and Ronald D. Warren	12-2	55

PRODUCTION

ACID TREATMENT

	Date	Page
Quality control at well site optimizes acidizing economics—George E. King and George B. Holman Jr.	3-18	139
$AlCl_3$ retards HF acid for more effective stimulations—Rick Gdanski	10-28	111

ANALYSIS

	Date	Page
ANNUAL PRODUCTION ISSUE. Analysis gives successful cement squeeze—Ben Bradford and Bob Reiners	4-1	71
Simple method finds barium in oil-field brines—Charles L. Hawes	8-19	130
Transient fluid flow applied to partially penetrated pay—William Hurst	8-26	76
Linearization and regression analysis technique predicts hyperbolic decline in reserves—Lester C. Luther	8-26	78
OFFSHORE CONSTRUCTION REPORT. Analysis picks best offshore cable fireproofing—B. G. Tompkins and Avery L. Howell Jr.	11-11	65

CEMENTING

	Date	Page
ANNUAL PRODUCTION ISSUE. Analysis gives successful cement squeeze—Ben Bradford and Bob Reiners	4-1	71
Strength of cementation is estimated from well logs—N. Stein	7-15	132

COMPLETIONS

	Date	Page
Texas considering imposition of well completion fee	3-25	49
Completion strategy includes clay and precipitate control—Joe Sandy, George R. Gardner, and John A. Ringhisen	5-6	193

COMPUTERS/MICROCOMPUTERS

	Date	Page
Hyperbolic decline—Conclusion: Computer model solution proposed—David A. Rowland and Chung Lin	1-21	77
Site theft reduced by microcomputer—Thomas S. Matthews	2-4	66
MICROCOMPUTER REPORT. Decline curve software closes the gap—Joe F. Marshall Jr. and George W. Bowman II	2-11	81
User's needs dictate features of oil/gas micro systems—Jeffrey M. Wilkinson	4-15	66
Computer-aided petroleum engineering—a necessity for the competitive edge—R. C. Ivey, John C. Spivey, Richard C. Wyman, and Linda Hayes	5-27	112
Reservoir simulation moves into third generation—Julius S. Aronofsky, Thomas F. Cox, and Stephen M. Lane	11-4	75

COMPUTERS, Programs

	Date	Page
User's needs dictate features of oil/gas micro systems—Jeffrey M. Wilkinson	4-15	66
Economic profile of Ohio's Clinton sand—J. W. Cumberlidge and W. D. McCullough	5-13	91
Programs predict pressures for two-phase flow—A. D. Hill and Donald C. Jacks	9-16	93

CORROSION

	Date	Page
Iron sponge: Still a top option for sour gas sweetening—John P. Anerousis and Stephen K. Whitman	2-18	71
ANNUAL PRODUCTION ISSUE. Saturation index predicts brine's scale-forming tendency—Leo A. Rogers, Mason B. Tomson, Jane M. Matty, and Larry R. Durrett	4-1	97
Critical velocity examined for effects of erosion-corrosion—Bruce Craig	5-27	99

COSTS

	Date	Page
Economic performance of oil projects evaluated by modified IRR—Laura Starks	4-22	71
OFFSHORE NORTHERN EUROPE REPORT. Development cost control vital in marginal projects off U.K.—Roger Vielvoye	6-10	128
Waste heat exchanger increases efficiency, reduces cost—Jack D. Brady and John S. Crews	8-19	111
Financial capital value criteria examined—Bert E. Johnston and James Purser	9-9	158
Economics seen as key factor for operations in deep water	12-23	21

ENHANCED RECOVERY METHODS

	Date	Page
Ryan/Holmes technology lands EOR projects—F. W. Schaffert and J. M. Ryan	1-28	133
Exxon plans more CO_2 floods in West Texas	2-4	42
California EOR, cogeneration sales are gas line targets	2-11	29
Two Texas cogeneration projects advancing	2-11	29
Sandia: Insulate couplings to prevent refluxing	2-11	36
Gulf to launch New Mexico waterflood	2-11	46
Characterization methods improve phase-behavior predictions—M. R. Brule, K. H. Kumar, and S. Watanasiri	2-11	87
Kansas Hugoton infill program urged—G. Alan Petzet	2-25	53
Texaco starts Alberta miscible floods	2-25	60
Infill program eyed for Altamont-Bluebell area	3-18	60
Quality control at well site optimizes acidizing economics—George E. King and George B. Holman Jr.	3-18	139
ANNUAL PRODUCTION ISSUE. Engine-exhaust gas offers alternative for EOR—Robert J. Hlozek	4-1	75
Shell test device checks CO_2 flood feasibility	4-15	43
New EOR process seen match for steamfloods	4-22	58
Gas cycling to boost Hatter's Pond recovery—G. Alan Petzet	4-29	56
Amoco schedules Louisiana waterflood	4-29	57
Murphy plans Alberta heavy oil project	5-20	42
Interfacial spreading agents increase waterflood production—Charles M. Blair Jr. and Charles A. Stout	5-20	55
GAO: Trim gulf royalties to encourage EOR	6-3	42
Pemex schedules offshore waterflood	6-17	66
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT. Arctic waterflood pipelines in Prudhoe Bay injection project require protection analysis—Charles L. Arnold	6-24	89
Permian basin CO_2 floods mushroom; more scheduled—Rick Hagar	7-8	17
CO_2, enhanced oil recovery in a 'new' Montana oil province: Sweetgrass arch—Dr. J. Henri N. Wennekers	7-15	147
Texas EOR project proposed, another approved	7-22	46
Amoco to start Wyoming's first big CO_2 project	8-5	31
Waste heat exchanger increases efficiency, reduces cost—Jack D. Brady and John S. Crews	8-19	111
Struggle develops over potential EOR gas market in California—Bob Williams	8-26	25
Two Canadian heavy oil projects advance	9-2	36
Enhanced recovery boosts U.S. crude reserves	9-9	64
Plains eyes Kansas Hugoton field infill project	9-9	72
Amoco starts up CO_2 recovery plant in big West Texas field	9-9	80
W. Texas CO_2 line picks up customers	9-9	80
GE plant to power waterflood in China's giant Daqing oil field	9-9	84
Study aims to determine states' role in EOR	9-23	51
CO_2: Properties and handling with safety—Sammie E. Saylors	9-23	128
Amoco schedules another CO_2 flood in Permian basin	9-30	21
System to control steam quality seen aid to EOR	10-28	56
Mitchell sets Wyoming pilot waterflood	11-11	41
Big waterflood under way in Colombian field	11-18	70
Mapping technology: a key to EOR control—J. R. Wayland Jr. and Alan J. Leighton	12-2	109

EQUIPMENT

	Date	Page
ANNUAL PRODUCTION ISSUE. Prudhoe challenges new choke-valve design—Dan L. Snyder	4-1	92
New elastomer developed specifically for arctic wellheads—Kelly Copley	7-1	60
Pressure device monitors frac performance	8-5	38
DEEPWATER TECHNOLOGY REPORT. Loads/forces considered for deepwater wellheads—Joe R. Fowler and William A. Valka	12-2	72

FIELD OPERATIONS

	Date	Page
High gas-liquids yield feature of small plant—Toby J. Armellini and Mack Baughn	1-7	78
Strip charts fine tune gas volume measurement—G. Alan Petzet	2-25	68
ANNUAL PRODUCTION ISSUE. Prudhoe challenges new choke-valve design—Dan L. Snyder	4-1	92
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT. Milne Point Unit—small but welcome	6-24	55
NORTH AMERICAN ARCTIC REPORT. ARCO eyes production start at Lisbourne during late 1986—Bob Williams	8-5	84

FLUID INJECTION

	Date	Page
Numerical simulator looks at cold-water injection and skin factor in damage assessment—F. Linge, C. H. Wu, and R. A. Startzman	2-18	81

FORECASTS, TRENDS, STATISTICS, SURVEYS

	Date	Page
Worldwide crude oil and gas production	1-14	117
Domestic crude oil production projected to 2000 on basis of resource capability—Joseph P. Riva Jr.	1-28	159
Worldwide crude oil and gas production	2-4	86
Adoption of Treasury's tax plan would deal crippling blow to industry	2-18	41
World crude, condensate flow in '84 logs first increase since '79—Bob Beck and Mike Obel	3-11	41
Communist countries show slight 1984 production gain	3-11	43
Worldwide crude oil and gas production	3-11	165
Key operations seen critical to U.S. oil reserves	4-1	56
Worldwide crude oil and gas production	4-1	165
Worldwide crude oil and gas production	5-6	276
Worldwide crude oil and gas production	6-10	174
U.S. exploration/production budgets trimmed	6-17	73
Worldwide crude oil and gas production	7-8	80
Worldwide crude oil and gas production	8-12	128
First half world oil flow fails to sustain 1984 increase	9-9	59
Soviet Union's slump trims Communist oil production	9-9	61
Worldwide crude oil and gas production	9-9	197
Worldwide crude oil and gas production	10-14	154
Increase seen in oil field chemical use	11-11	34
Worldwide crude oil and gas production	11-11	126
Worldwide crude oil and gas production	12-9	80
WORLDWIDE REPORT. World oil production down 1.7% in 1985	12-30	63
WORLDWIDE REPORT. World oil and gas at a glance	12-30	66
WORLDWIDE REPORT. Worldwide Production—Robert J. Beck	12-30	70

FORMATION FRACTURING

	Date	Page
Frac treatment quality improved with field rheology unit—Subhash N. Shah, Yung N. Lee, and David G. Jensen	2-4	47
Perforating damage and shot density analyzed—M. C. Aaron Cheng	3-4	112
Frac model in 3D—1: New simulator makes fracture design routine—Bruce R. Meyer	6-17	87
Frac model in 3D—2: Proppant placement analyzed—Bruce R. Meyer	7-1	62
Frac model in 3D—3: Hydraulic fracturing simulator's capabilities examined—Bruce R. Meyer	7-22	83
Frac model in 3D—conclusion: Graphics module outputs fracturing results—Bruce R. Meyer	7-29	132
Pressure device monitors frac performance	8-5	38

GAS LIFT

	Date	Page
ANNUAL PRODUCTION ISSUE: Engine-exhaust gas offers alternative for EOR—Robert J. Hlozek	4-1	75

GATHERING (Lines, Systems, Metering, Storage, Tankage)

	Date	Page
New system improves liquid CO_2 metering accuracy—Stan Stephenson	2-25	94
OFFSHORE REPORT: Simplified production-mooring system developed—Jean Arnaud, Rene Loire, Michel Pagezy, and Peter J. Piaseckyj	5-6	136
On-line compressibility factors can improve metering by minimizing measurement error—Rex T. Ellington, M. J. Hill, and J. L. Savidge	9-2	70

LEASE AUTOMATION

	Date	Page
New system improves liquid CO_2 metering accuracy—Stan Stephenson	2-25	94
OFFSHORE REPORT: Offshore instrument/control systems evaluated—Bill G. Tompkins and Mike L. Christensen	5-6	166

LOGGING (formation, spinner, etc.)

	Date	Page
Resistivity and density logs key to fluid pressure estimates—N. Stein	4-8	81
Logs help approximate reservoir temperature—Walter H. Fertl	4-29	89
Unique routine estimates velocity ratio values—N. Stein	6-3	76
LDT tool gives improved formation evaluation—A. M. Borai and M. A. Muhsin	7-8	60
Strength of cementation is estimated from well logs—N. Stein	7-15	132
Quantitative mud-logging system tracks upward gas migration from the pay zone—Robert H. Reitsema, F. A. Lindberg, and A. J. Kaltenback	10-28	116
Mud log finds erratic variation in gas composition from surface to reservoir—Robert H. Reitsema	11-4	81

MAINTENANCE

	Date	Page
Iron sponge: Still a top option for sour gas sweetening—John P. Anerousis and Stephen K. Whitman	2-18	71
New elastomer developed specifically for arctic wellheads—Kelly Copley	7-1	60
Sand control—1: Gravel packs require planning—Derry D. Sparlin and Raymond W. Hagen Jr.	8-5	87
Sand control—conclusion: Prevention of formation damage critical—Derry D. Sparlin and Raymond W. Hagen Jr.	8-12	92

MANAGEMENT

	Date	Page
Economic performance of oil projects evaluated by modified IRR—Laura Starks	4-22	71
Financial capital value criteria examined—Bert E. Johnston and James Purser	9-9	158

OFFSHORE

	Date	Page
OFFSHORE SOUTHERN CALIFORNIA REPORT: Big finds spur push off California—Bob Williams	1-14	55
U.S. Arctic waters due first development	2-11	36
Texaco hails Highlander technology	3-11	48
Coast Guard may tighten offshore safety rules	3-18	66
Conoco eyes TLP concept for Gulf of Mexico	4-1	50
OFFSHORE REPORT: Compliant jacket challenges deep water with new design—Terrence L. McGillivray and Thomas B. Coull	5-6	112
OFFSHORE REPORT: Simplified production-mooring system developed—Jean Arnaud, Rene Loire, Michel Pagezy, and Peter J. Piaseckyj	5-6	136
OFFSHORE REPORT: Offshore instrument/control systems evaluated—Bill G. Tompkins and Mike L. Christensen	5-6	166
OFFSHORE NORTHERN EUROPE REPORT: Oil production up, activity levels high off northern Europe—Roger Vielvoye	6-10	91
OFFSHORE NORTHERN EUROPE REPORT: Norway eyes replacements for Sleipner gas project—Roger Vielvoye	6-10	104
OFFSHORE NORTHERN EUROPE REPORT: Dutch offshore crude and gas production post increases—Roger Vielvoye	6-10	116
OFFSHORE NORTHERN EUROPE REPORT: Technology, terms keys to small producer work—Roger Vielvoye	6-10	122
OFFSHORE NORTHERN EUROPE REPORT: Development cost control vital in marginal projects off U.K.—Roger Vielvoye	6-10	128
Shell platform to shatter water depth record	6-17	78
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: First Arctic offshore field, Endicott, on decade-long way to production—M. I. Curtis and D. B. Huxley	6-24	64
NORTH AMERICAN ARCTIC REPORT: Canadian Arctic production prospects brighten	8-5	57
NORTH AMERICAN ARCTIC REPORT: PIP phaseout pushes Canadian frontier outlay	8-5	60
Induced offshore hydrodynamic force calculated—Eugene M. Gershunov	9-2	62
OFFSHORE CONSTRUCTION REPORT: Classification group looks at floating produciton storage and offloading systems—David E. Jones and Gregory Shark	11-11	60
OFFSHORE CONSTRUCTION REPORT: Analysis picks best offshore cable fireproofing—B. G. Tompkins and Avery L. Howell Jr.	11-11	65
OFFSHORE CONSTRUCTION REPORT: Faulting, typhoons key to Weizhou 10-3 plans—Pierre Marty	11-11	86
DEEPWATER TECHNOLOGY REPORT: Deepwater activity in gulf—Rick Hagar	12-2	64
DEEPWATER TECHNOLOGY REPORT: Loads/forces considered for deepwater wellheads—Joe R. Fowler and William A. Valka	12-2	72
Calculating the ice-clearing load of offshore structure imposed by a rubble field—Eugene M. Gershunov	12-16	120
Economics seen as key factor for operations in deep water	12-23	21
Tests set for subsea production system	12-30	41
European systems check integrity of marine installations	12-30	42

OPERATING IDEAS

	Date	Page
OFFSHORE REPORT: Compliant jacket challenges deep water with new design—Terrence L. McGillivray and Thomas B. Coull	5-6	112
Frac model in 3D—1: New simulator makes fracture design routine—Bruce R. Meyer	6-17	87
Frac model in 3D—2: Proppant placement analyzed—Bruce R. Meyer	7-1	62
Frac model in 3D—3: Hydraulic fracturing simulator's capabilities examined—Bruce R. Meyer	7-22	83
Frac model in 3D—conclusion: Graphics module outputs fracturing results—Bruce R. Meyer	7-29	132
Programs predict pressures for two-phase flow—A. D. Hill and Donald C. Jacks	9-16	93
OFFSHORE CONSTRUCTION REPORT: Analysis picks best offshore cable fireproofing—B. G. Tompkins and Avery L. Howell Jr.	11-11	65
European systems check integrity of maring installations	12-30	42
Drilling statistics influence most-appropriate risk technique—Robert H. Caldwell and Daniel Johnston	12-30	136

POLLUTION CONTROL

	Date	Page
Oil-field water handling—1: Qualitative separation = theory + judgment—Bryant W. Bradley	10-14	121
Oil-field water handling—2: Coalescers offer unique design features—Bryant W. Bradley	11-18	136
Oil-field water handling—3: Flotation offers another water/oil separation alternative—Bryant W. Bradley	12-9	42

PUMPING

	Date	Page
Enhancement of fiberglass sucker-rod design is offered—Donald F. Hallden	9-30	58

RESEARCH

	Date	Page
Frac model in 3D—1: New simulator makes fracture design routine—Bruce R. Meyer	6-17	87
Frac model in 3D—2: Proppant placement analyzed—Bruce R. Meyer	7-1	62
Frac model in 3D—3: Hydraulic fracturing simulator's capabilities examined—Bruce R. Meyer	7-22	83
Frac model in 3D—conclusion: Graphics module outputs fracturing results—Bruce R. Meyer	7-29	132

RESERVES

	Date	Page
Hyperbolic decline—1: New linear method gives constants of hyperbolic decline—David A. Rowland and Chung Lin	1-14	86
Hyperbolic decline—Conclusion: Computer model solution proposed—David A. Rowland and Chung Lin	1-21	77
New giant fields in the U.S. await development	1-28	114
Domestic crude oil production projected to 2000 on basis of resource capability—Joseph P. Riva Jr.	1-28	159
MICROCOMPUTER REPORT: Decline curve software closes the gap—Joe F. Marshall Jr. and George W. Bowman II	2-11	81
Estimates of potential U.S. gas resource declines	3-25	50
Quality of reserve estimate—1: Cutting through the mystery of reserve estimates—Eddie J. Hudson and Stephen H. Neuse	3-25	103
Mexican hydrocarbon reserves decline in 1984	4-1	48
Key operations seen critical to U.S. oil reserves	4-1	56
ANNUAL PRODUCTION ISSUE: Quality of reserve estimate—2: Depletion stage determines most effective methods for reserve-estimate integrity—E. J. Hudson and Stephen H. Neuse	4-1	80
Canada adjusts frontier reserves estimates	5-13	68
Reserve assessment under uncertainty—a new approach—Jean Marie Bourdaire, Rustum Jean Byramjee, and Ronald Pattinson	6-10	135
Linearization and regression analysis technique predicts hyperbolic decline in reserves—Lester C. Luther	8-26	78
Enhanced recovery boosts U.S. crude reserves	9-9	64

	Date	Page
Reduced prices spark purchases of oil and gas reserves in U.S.—G. Alan Petzet and Elizabeth Drake	10-14	43
WORLDWIDE REPORT. World oil production down 1.7% in 1985	12-30	63
WORLDWIDE REPORT. Worldwide oil and gas at a glance	12-30	66
RESERVOIR STUDIES		
Hyperbolic decline—1: New linear method gives constants of hyperbolic decline—David A. Rowland and Chung Lin	1-14	86
Hyperbolic decline—Conclusion: Computer model solution proposed—David A. Rowland and Chung Lin	1-21	77
Conformal mapping solves intricate problems—William Hurst	1-28	138
MICROCOMPUTER REPORT. Decline curve software closes the gap—Joe F. Marshall Jr. and George W. Bowman II	2-11	81
Characterization methods improve phase-behavior predictions—M. R. Brule, K. H. Kumar, and S. Watanasiri	2-11	87
Xanthan gel system effective for profile modification—Larry Burkholder	4-15	68
Logs help approximate reservoir temperature—Walter H. Fertl	4-29	89
Economic profile of Ohio's Clinton sand—J. T. Cumberlidge and W. D. McCullough	5-13	91
Frac model in 3D—1: New simulator makes fracture design routine—Bruce R. Meyer	6-17	87
Frac model in 3D—2: Proppant placement analyzed—Bruce R. Meyer	7-1	62
Frac model in 3D—3: Hydraulic fracturing simulator's capabilities examined—Bruce R. Meyer	7-22	83
Frac model in 3D—conclusion: Graphics module outputs fracturing results—Bruce R. Meyer	7-29	132
Sand control—1: Gravel packs require planning—Derry D. Sparlin and Raymond W. Hagen Jr.	8-5	87
Sand control—conclusion: Prevention of formation damage critical—Derry D. Sparlin and Raymond W. Hagen Jr.	8-12	92
Convenient flow-line equations derived for first approximation—John C. Baumann	10-7	111
Equations determine locus of PVT curves—Paul Guieze, John Michael Williams, and Nikos Varotsis	10-21	79
Reservoir simulation moves into third generation—Julius S. Aronofsky, Thomas F. Cox, and Stephen M. Lane	11-4	75
Mud log finds erratic variation in gas composition from surface to reservoir—Robert H. Reitsema	11-4	81
Model improves PVT predictions—E. O. Udegbunam	11-25	102
Mapping technology, a key to EOR control—J. R. Wayland Jr. and Alan J. Leighton	12-2	109
Drilling statistics influence most-appropriate risk technique—Robert H. Caldwell and Daniel Johnston	12-30	136
SAFETY		
Site theft reduced by microcomputer—Thomas S. Matthews	2-4	66
Coast Guard may tighten offshore safety rules	3-18	66
CO_2: Properties and handling with safety—Sammie E. Saylors	9-23	128
OFFSHORE CONSTRUCTION REPORT. Faulting, typhoons key to Weizhou 10-3 plans—Pierre Marty	11-11	86
Calculating the ice-clearing load on offshore structure imposed by a rubble field—Eugene M. Gershunov	12-16	120
Module ventilation rates quantified—William E. Gale	12-23	39
SCALE AND DEPOSITIONS		
ANNUAL PRODUCTION ISSUE. Saturation index predicts brine's scale-forming tendency—Leo A. Rogers, Mason B. Tomson, Jane M. Matty, and Larry R. Durrett	4-1	97
SEPARATION (oil, gas, water)		
Oil-field water handling—3: Flotation offers another water oil separation alternative—Bryant W. Bradley	12-9	42
WATER DISPOSAL		
Oil-field water handling—1: Qualitative separation = theory + judgment—Bryant W. Bradley	10-14	121
Oil-field water handling—2: Coalescers offer unique design features—Bryant W. Bradley	11-18	136
Brine treatment plant starts up in Pennsylvania	11-25	50
Oil-field water handling—3: Flotation offers another water oil separation alternative—Bryant W. Bradley	12-9	42
WELL STIMULATION		
Numerical simulator looks at cold-water injection and skin factor in damage assessment—F. Linge, C. H. Wu, and R. A. Startzman	2-18	81
$AlCl_3$ retards HF acid for more effective stimulations—Rick Gdanski	10-28	111
WELL TESTING		
Transient fluid flow applied to partially penetrated pay—William Hurst	8-26	76

GAS PROCESSING

	Date	Page
ANALYSIS		
Calculator program trilogy characterizes commingled gas streams—Rob Flowers	8-26	60
CALCULATOR/COMPUTER PROGRAMS		
Calculator program trilogy characterizes commingled gas streams—Rob Flowers	8-26	60
CORROSION		
Amine inhibitor copes with corrosion—Steve Hopson	7-1	44
Corrosion-inhibition system passes severest test at Chevron's Princess MEA plant—H. A. Wong, R. Kohler, A. J. Kosseim, D. J. Kubek, and J. G. McCullough	11-11	100
COSTS		
Two combined cryogenic processes cut sour natural-gas processing cost—Robert D. Denton and D. D. Rule	8-19	120
CRYOGENICS		
Refrigeration cycles for future base-load LNG plants need a close look—Jacob M. Geist	2-4	56
Two combined cryogenic processes cut sour natural-gas processing cost—Robert D. Denton and D. D. Rule	8-19	120
DEHYDRATION		
Drying supercritical CO_2 demands care—Charles B. Wallace	6-24	98
ENERGY CONSERVATION		
An energy-efficient refrigeration system developed for natural gas liquids recovery—Richard A. Corbett	1-21	74
Waste-heat recovery saves fuel for Amoco—G. H. Tilden, C. R. Root, and M. L. Ruggiero	5-27	108
ANNUAL GAS PROCESSING REPORT. LPG extraction process cuts energy needs—T. R. Tomlinson and R. Banks	7-15	81
AHP gives NGL fractionation energy savings—William F. Davidson and Donald C. Erickson	8-5	107
Automated combined-cycle, energy-recovery system is successful in gas-processing plant—Peter Truman	9-2	64
EQUIPMENT		
Microprocessor saves hp by improving compressor's surge control—Jeremy Shaffer	12-23	42
FORECASTS, TRENDS, STATISTICS, SURVEYS		
WORLDWIDE CONSTRUCTION REPORT. Gas Processing—Ailleen Cantrell	4-22	117
ANNUAL GAS PROCESSING REPORT. Numbers positive for 1984 gas processing—Ted Wett	7-15	71
ANNUAL GAS PROCESSING REPORT. Gas processors' production up, margins down—Ron Cannon	7-15	77
ANNUAL GAS PROCESSING REPORT. Worldwide gas processing survey—Ailleen Cantrell	7-15	90
Worldwide sulfur derived from oil and gas—Ailleen Cantrell	9-16	117
WORLDWIDE CONSTRUCTION REPORT. Gas processing—Ailleen Cantrell	10-21	100
HEAT TRANSFER		
How to calculate sulfur storage-tank heat loss—W. L. Scheirman and T. F. Rogers	1-14	96
INSTRUMENTATION, Control		
Anatomy of a gas-processing-plant control system retrofit—R. L. Folks	7-22	80
LIQUEFIED NATURAL GAS (LNG)		
Talks extended on Canadian LNG project	1-7	70
Alaskan LNG exports to Orient due study	2-4	43
Refrigeration cycles for future base-load LNG plants need a close look—Jacob M. Geist	2-4	56
Canadian LNG project loses one customer	2-11	30
Australian LNG export project at critical stage	4-22	46
Japanese utilities agree to import LNG from Thailand	7-8	29
Contractor named for Australian LNG project	7-29	71
LNG shipments to Orient seen best outlet for North Slope gas	9-9	76
LNG storage unit planned in Ontario	10-21	38
LIQUEFIED PETROLEUM GAS (LPG)		
LPG trade seen lower than expected	4-8	42
ANNUAL GAS PROCESSING REPORT. LPG extraction process cuts energy needs—T. R. Tomlinson and R. Banks	7-15	81
Improving LPG recovery at West Pembina—G. R. Daviet and N. C. Hircock	10-21	74
Emergency shutdown pressure surge predictions limit LPG loading—N. A. Rammah	11-25	87
Process makes aromatics from LPG—J. R. Mowry, R. F. Anderson, and J. A. Johnson	12-2	128
MANAGEMENT		
Charts for velocity, quantity give quick stack gas flow—S. Rajaram	5-20	59
NATURAL GAS PRODUCTS		
High gas-liquids yield feature of small plant—Toby J. Armellini and Mack Baughn	1-7	78
How to calculate sulfur storage-tank heat loss—W. L. Scheirman and T. F. Rogers	1-14	96

	Date	Page
Methanol cannot economically dislodge gasoline—Laurence H. Cohen and Herman L. Muller	1-28	119
Mixed refrigerants proven efficient in natural-gas-liquids recovery process—D. H. MacKenzie and S. T. Donnelly	3-4	116
Valuable hydrocarbons recovered by fuel conditioning—John W. Thompson and Tom Steiner	3-11	130
Tracers aid NH_3 unit's mass-balance values	3-18	142
Sulfur recovery hiked in Claus Sulfreen units at Ram River—Robert S. Coward and Warren M. Skaret	4-8	86
WORLDWIDE CONSTRUCTION REPORT. Sulfur—Ailleen Cantrell	4-22	114
ANNUAL GAS PROCESSING REPORT. LPG extraction process cuts energy needs—T. R. Tomlinson and R. Banks	7-15	81
Iron sponge is economical and effective for NGL sweetening—B. J. Davis, J. P. Anerousis, and O. D. Handley	9-23	122
Improving LPG recovery at West Pembina—G. R. Daviet and N. C. Hircock	10-21	74
WORLDWIDE CONSTRUCTION REPORT. Sulfur—Ailleen Cantrell	10-21	100

PLANT PRACTICES

An energy efficient-refrigeration system developed for natural gas liquids recovery—Richard A. Corbett	1-21	74
Charts for velocity, quantity give quick stack gas flow—S. Rajaram	5-20	59
Drying supercritical CO_2 demands care—Charles B. Wallace	6-24	98
Automated combined-cycle, energy-recovery system is successful in gas-processing plant—Peter Trumen	9-2	64
Microprocessor saves hp by improving compressor's surge control—Jeremy Shaffer	12-23	42

PLANTS, General

Sun opening two Michigan gas plants	12-16	54

PROCESSES

Ryan Holmes technology lands EOR projects—F. W. Schaffert and J. M. Ryan	1-28	133
Take care in picking membranes to combine with other processes for CO_2 removal—Ron Schendel and James Seymour	2-18	84
First U.S. Sulfreen unit in Dakota gas plant—G. W. Davis	2-25	108
Mixed refrigerants proven efficient in natural-gas-liquids recovery process—D. H. MacKenzie and S. T. Donnelly	3-4	116
Sulfur recovery hiked in Claus Sulfreen units at Ram River—Robert S. Coward and Warren M. Skaret	4-8	86
CO_2-rich mixtures—1: CO_2 streams pose new design considerations—James L. Case, Bernard F. Ryan, and John E. Johnson	5-6	175
CO_2-rich mixtures—2: Water in high-CO_2 stream complicates design factors—James L. Case, Bernard F. Ryan, and John E. Johnson	5-13	103
Tail-gas treating system proves out in field test on operating Claus plant—L. Kroop, P. W. Sigmund, and G. W. Taggart	6-3	64
Expander-gas processing plant converted to boost C_3 recovery at Canada's Judy Creek—Shuaib A. Khan	6-3	78
New gas-sweetening solvent proves successful in four field trials—J. J. Byeseda, J. A. Deetz, and W. P. Manning	6-10	144
ANNUAL GAS PROCESSING REPORT. LPG extraction process cuts energy needs—T. R. Tomlinson and R. Banks	7-15	81
Two combined cryogenic processes cut sour natural-gas processing cost—Robert D. Denton and D. D. Rule	8-19	120
Iron sponge is economical and effective for NGL sweetening—B. J. Davis, J. P. Anerousis, and O. D. Handley	9-23	122
Reults confirm membrane's H_2 recovery role	10-28	121
Corrosion-inhibition system passes severest test at Chevron's Princess MEA plant—H. A. Wong, R. Kohler, A. J. Kosseim, D. J. Kubek, and J. G. McCullough	11-11	100
Process makes aromatics from LPG—J. R. Mowry, R. F. Anderson, and J. A. Johnson	12-2	128
System for degassing liquid sulfur can reduce total hydrogen sulfide to acceptable levels—C. M. Schicho, E. A. Watson, K. R. Clem, and D. Hartley	12-9	56

SAFETY

Hydrogen sulfide service dictates special equipment design above requirements—C. Richard Sivalls	7-8	56
Emergency shutdown pressure surge predictions limit LPG loading—N. A. Rammah	11-25	87

STORAGE

How to calculate sulfur storage-tank heat loss—W. L. Scheirman and T. F. Rogers	1-14	96
LNG storage unit planned in Ontario	10-21	38
Blasts, fire hit Gulf Coast storage	11-11	38
Plan for Spanish terminals advances	11-25	38

TREATING

Tail-gas treating system proves out in field test on operating Claus plant—L. Kroop, P. W. Sigmund, and G. W. Taggart	6-3	64
Modular system cleans up FCC fuel gas—Herbert W. Wizig	8-12	78
Simulation mirrors commercial amine units—M. S. Sivasubramanian, H. Sardar, and Ralph W. Wieland	10-7	133

PIPELINE

GENERAL

Costs

	Date	Page
OGJ Morgan Gas-Pipeline Cost Index (1st QTR '84): Activity, costs up in competitive market—Joseph M. Morgan	1-21	81
OGJ-Morgan Pipeline Cost Index—Oil (2nd Quarter '84): Lower labor costs flatten construction index curve—Joseph M. Morgan	2-25	92
OGJ-Morgan Pipeline Cost Index—Gas (2nd Qtr '84): Construction activity increases; prices hold—Joseph M. Morgan	3-25	126
House panel urges gas line user fees	4-22	44
OGJ-Morgan Pipeline Cost Index—Oil (3rd Qtr '84): Lower labor costs helped hold oil pipeline-building index to slight increase—Joseph M. Morgan	5-13	120
OGJ-Morgan Pipeline Cost Index—Gas: 3rd Qtr 1984: Gas-pipeline construction costs rise fractionally—Joseph M. Morgan	6-17	92
OGJ-Morgan Pipeline Cost Index—Oil (4th Qtr 1984): Costs advance slowly despite building rebound—Joseph M. Morgan	8-12	97
OGJ-Morgan Pipeline Cost Index—Gas (4th QTR 1984:) Planned construction activity leaped, costs crept ahead—Joseph M. Morgan	9-16	101
OGJ-Morgan Pipeline Cost Index: Oil (1st QTR 1985). Construction costs continue 1984's moderate pace—Joseph M. Morgan	11-4	99
PIPELINE ECONOMICS REPORT. U.S. pipeline mileage up a bit in 1984—Warren R. True	11-25	55
PIPELINE ECONOMICS REPORT. OGJ-Morgan Pipeline Cost Index—Gas: (1st QTR 1985): Construction costs continue flat, while offshore activity shows promise—Joseph M. Morgan	11-25	82
OGJ-Morgan Pipeline Cost Index—Oil (2nd Qtr 1985): Cost easing continues in face of recovery—Joseph M. Morgan	12-30	153

Forecasts, Trends, Statistics, Surveys

Ingaa sees new era for gas pipelines	1-7	60
Pipeline construction to decline in non-Communist areas in 1985—Rick Hagar and Warren R. True	1-21	25
OGJ Morgan Gas-Pipeline Cost Index (1st QTR '84): Activity, costs up in competitive market—Joseph M. Morgan	1-21	81
Curren: Pipeline construction unlikely to recover from slump	1-28	65
OGJ-Morgan Pipeline Cost Index—Oil (2nd Quarter '84): Lower labor costs flatten construction index curve—Joseph M. Morgan	2-25	92
OGJ-Morgan Pipeline Cost Index—Gas (2nd Qtr '84): Construction activity increases; prices hold—Joseph M. Morgan	3-25	126
Producers seek gas transport European pipe	4-1	59
U.S. bans delivery of Ce'eron's European pipe	4-8	44
WORLDWIDE CONSTRUCTION REPORT. Pipelining—Ailleen Cantrell	4-22	120
Electro-optic monitoring studies for Arctic lines	5-6	83
BP proposes reduction in trans-Alaska line tariff	5-6	84
HNG InterNorth to be longest U.S. gas system	5-13	70
OGJ-Morgan Pipeline Cost Index—Oil (3rd Qtr '84): Lower labor costs helped hold oil pipeline-building index to slight increase—Joseph M. Morgan	5-13	120
Comment: Further jolting changes await U.S. gas pipeline companies—J. M. Seidl	5-27	43
OGJ-Morgan Pipeline Cost Index—Gas (3rd Qtr 1984): Gas-pipeline construction costs rise fractionally—Joseph M. Morgan	6-17	92
Industry hits FERC's revamp proposal	8-5	44
OGJ-Morgan Pipeline Cost Index—Oil (4th Qtr 1984): Costs advance slowly despite building rebound—Joseph M. Morgan	8-12	97
OGJ-Morgan Pipeline Cost Index—Gas (4th Qtr 1984): Planned construction activity leaped, costs crept ahead—Joseph M. Morgan	9-16	101
Tough times seen for gas pipelines	9-30	32
Pipeline contractors president predicts lengthy slack period	10-7	56
WORLDWIDE CONSTRUCTION REPORT. Pipelining—Ailleen Cantrell	10-21	104
OGJ-Morgan Pipeline Cost Index—Oil (1st QTR 1985): Construction costs continue 1984's moderate pace—Joseph M. Morgan	11-4	99
OFFSHORE CONSTRUCTION REPORT. Uptick due for U.K. North Sea pipelines—Warren R. True	11-11	55
PIPELINE ECONOMICS REPORT. U.S. pipeline mileage up a bit in 1984—Warren R. True	11-25	55
PIPELINE ECONOMICS REPORT. OGJ-Morgan Pipeline Cost Index—Gas (1st QTR 1985): Construction costs continue flat, while offshore activity shows promise—Joseph M. Morgan	11-25	82
Pipelines, distributors see risks in FERC order	12-9	37
OGJ-Morgan Pipeline Cost Index—Oil (2nd Qtr 1985): Cost easing continues in face of recovery—Joseph M. Morgan	12-30	153

Nonpetroleum

Only two U.S. coal slurry lines still on drawing boards	1-21	28
W. Texas CO_2 line picks up customers	9-9	80
CO_2 flowing through Central Basin line	12-23	32

Safety

	Date	Page
Riser design codes—1: Offshore pipeline design codes compared for loads, stress limits—Denny R. Stephens and Donald P. McConnell	7-15	128
Riser design codes—Conclusion: Pipeline design codes compared graphically—Denny R. Stephens and Donald P. McConnell	7-29	139
ANNUAL PIPELINE REPORT. Texoma conversion aims at system safety—James C. Good	8-19	77
Leak, rupture detection can be improved—Edward Gordon, R. E. Murphy, and P. D. Dean	11-4	84
OFFSHORE CONSTRUCTION REPORT. Soil, seismic studies essential for lines in earthquake areas—B. K. Jinsi	11-11	72

CONSTRUCTION, New Lines

Crude

	Date	Page
Celeron oil line construction to start in June	5-27	38
Construction advances on U.S. west-east line—G. Alan Petzet	9-16	80
Mereenie crude oil pipeline completed ahead of schedule	11-25	49

Natural Gas

	Date	Page
U.S.S.R. starts up another big line	5-27	40
Oresund submarine pipeline—Sweden's access to North Sea gas—Max Eliasson, Jan Molin, and Jan Erik Janson	10-7	120
Soviets complete Astrakhan pipelines	11-18	79
How the Dampier-to-Perth pipeline was commissioned—David A. Hesse	12-9	39

Nonpetroleum

	Date	Page
Design of Cortez CO_2 system detailed—Don W. Barry	7-22	96
Suspected sabotage hits W. Texas line	10-14	67
W. Texas area draws another CO_2 line to serve EOR projects	10-21	42

CONSTRUCTION PRACTICES

Methods

	Date	Page
Pipeline lowering—1: Calculations help control stresses—John F. Kiefner and T. A. Wall	10-14	128
Pipeline lowering—conclusion: Calculations for lowering method hold stress within fixed limits—John F. Keifner and T. A. Wall	10-21	70

Welding

	Date	Page
Test measures ERW line pipe weld ductility—Dean N. Williams and Robert J. Eiber	4-8	96

OPERATION AND DESIGN

Analysis

	Date	Page
Hydraulic analysis aids high-pressure system design—T. E. Stripling, A. U. Khan, and K. Dillon	1-28	125
MICROCOMPUTER REPORT. Pipeline flow analyses employ spreadsheet concept—Mike Hein	2-11	68
Read-only-memory pipelay analysis module written for hand-held computer—A. H. Mousselli	6-10	140
Laboratory, test-loop analyses illustrate waxy-crude transport methods—Heinz G. Nicolai	11-18	132
Condensate-line correlations for calculating holdup, friction compared to field data—William Battarra, Oscar Mariani, Marco Gentilini, and Giancarlo Giacchetta	12-30	148

Coatings

	Date	Page
Soil stress assessment can prevent corrosion, reduce pipeline coating damage—Bing C. Yen and Glenn D. Tofani	8-26	63
Cathodic protection, coatings protect Statpipe system—S. Lund, H. T. Akten, R. T. Page, and K. A. Binns	12-23	47

Compressors

	Date	Page
Mechanical dry seal cuts pipeline compressor maintenance costs, downtime—R. C. Hesje and R. A. Peterson	3-18	150
Model changes improve compressor-station piping pressure-loss predictions—Timothy R. Meyer	4-29	96
Compressor station transient flow modeled—W. J. Turner and M. J. Simonson	5-20	79
Compressor analysis—1: Computer system aids in compressor selection—J. L. Pierson and K. D. Wilcox	6-24	105
Compressor analysis (conclusion): Computer sets station guidelines—J. L. Pierson and K. D. Wilcox	7-1	56

Computer Programs

	Date	Page
Program predicts pressure drops for single-phase fluids flowing in pipes, fittings—T. M. Fadel	1-21	61
MICROCOMPUTER REPORT. Pipeline flow analyses employ spreadsheet comcept—Mike Hein	2-11	68
PC program selects gas-line sizes—Ross E. Hodges	4-1	118
Program gives design data for multiple-orifice system to avoid cavitation—P. G. Goksem and I. D. Patel	4-15	56
Routine for computer or calculator solves gas-flow problems—James H. Stannard Jr.	4-15	62
Compressor station transient flow modeled—W. J. Turner and M. J. Simonson	5-20	79

Computers/Microcomputers

	Date	Page
Read-only-memory pipelay analysis module written for hand-held computer—A. J. Mousselli	6-10	140
Compressor analysis—1: Computer system aids in compressor selection—J. L. Pierson and K. D. Wilcox	6-24	105
Compressor analysis—(conclusion): Computer sets station guidelines—J. L. Pierson and K. D. Wilcox	7-1	56
Knowledge of pipeline system key to software specification—Travis E. Stripling	12-16	110

Corrosion

	Date	Page
Soil stress assessment can prevent corrosion, reduce pipeline coating damage—Bing C. Yen and Glenn D. Tofani	8-26	63
Cathodic protection, coatings protect Statpipe system—S. Lund, H. T. Akten, R. T. Page, and K. A. Binns	12-23	47

Design Concepts

	Date	Page
Hydraulic analysis aids high-pressure system design—T. E. Stripling, A. U. Khan, and K. Dillon	1-28	125
Drag-reducing agents—1: The basics of drag reduction—C. B. Lester	2-4	51
Drag-reducing agents—2: Here's how drag-reducing agent can outweigh looping or boosting—C. B. Lester	2-18	76
Drag-reducing agents—3: How active, passive drag affect DRA injections—C. B. Lester	3-4	107
Drag-reducing agents—Conclusion: What to expect from and how to handle commercially available drag-reducing agents—C. B. Lester	3-11	116
Alternate to standard friction factor equation—Garry A. Gregory and Maria Fogarasi	4-1	120
Program gives design data for multiple-orifice system to avoid cavitation—P. G. Goksem and I. D. Patel	4-15	56
Transition temperature tests show fracture behavior—W. A. Maxey, F. O. Koch, A. Peeck, G. Junker, G. H. Vogt, P. A. Peters, J. Kugler, and K. Seifert	4-22	75
CO_2-rich mixtures—1: CO_2 streams pose new design considerations—James L. Case, Bernard F. Ryan, and John E. Johnson	5-6	175
Ultimate-strength design method ensures swaged tubing-connection integrity—Gregg D. Ward	5-6	196
CO_2-rich mixtures—2: Water in high-CO_2 stream complicates design factors—James L. Case, Bernard F. Ryan, and John E. Johnson	5-13	103
Wind-induced fatigue damage estimated for surface oil pipelines in the Arctic—D. G. Honegger, D. J. Nyman, and K. J. Nyman	7-8	49
Riser design codes—1: Offshore pipeline design codes compared for loads, stress limits—Denny R. Stephens and Donald P. McConnell	7-15	128
Design of Cortez CO_2 system detailed—Don W. Barry	7-22	96
Riser design codes—conclusion: Pipeline design codes compared graphically—Denny R. Stephens and Donald P. McConnell	7-29	139
ANNUAL PIPELINE REPORT. Pipeline in Canada's far north in service—A. R. Pick and J. D. Smith	8-19	71
Design methods for two-phase pipelines compared, evaluated—Mohammed E. Osman and Samy A. El-Feky	9-2	57
Subsea flowlines—1: J-tube pull-in theory is applied to North Sea's Troll multiple flowline bundles—G. J. Maten and M. Hales	9-23	138
Subsea flowlines—conclusion: Full-scale pull-in loads for multiple flowline bundles in North Sea's Troll field predicted—G. J. Maten and M. Hales	9-30	42
Pipeline lowering—1: Calculations help control stresses—John F. Kiefner and T. A. Wall	10-14	128
Pipeline lowering—conclusion: Calculations for lowering method hold stress within fixed limits—John F. Keifner and T. A. Wall	10-21	70
OFFSHORE CONSTRUCTION REPORT. Soil, seismic studies essential for lines in earthquake areas—B. K. Jinsi	11-11	72
DEEPWATER TECHNOLOGY REPORT. Industry group to study deepwater line connections—Warren R. True	12-2	98

Inspection

	Date	Page
Canadian line-inspection procedures detailed—R. M. Jamieson	3-25	107
Canadian operator details internal inspection program—Gary C. Robinson	6-3	55
British Gas has seamless pipe inspection program—Lawrence Jackson, Ernest Shannon, and G. A. Adey	9-9	147

Maintenance

	Date	Page
Hydrostatic retesting—1: Model predicts hydrostatic retest intervals—John F. Kiefner and Thomas C. Forte	1-7	93
Hydrostatic retesting—Conclusion: Model shows value of wide pressure margins—John F. Kiefner and Thomas C. Forte	1-14	83
TAPS to replace segment hit by subsidence	1-28	66
Pipeline repair technique cuts downtime—Gilles Bellamy, Jean-Francois Jouanneau, Rene Quin, and Paul Wiet	2-11	101
Mechanical dry seal cuts pipeline compressor maintenance costs, downtime—R. C. Hesje and R. A. Peterson	3-18	150
Canadian line-inspection procedures detailed—R. M. Jamieson	3-25	107
Test measures ERW line pipe weld ductility—Dean N. Williams and Robert J. Eiber	4-8	96
Transition temperature tests show fracture behavior—W. A. Maxey, F. O. Koch, A. Peeck, G. Junker, G. H. Vogt, P. A. Peters, J. Kugler, and K. Seifert	4-22	75

	Date	Page
Canadian operator details internal inspection program—Gary C. Robinson	6-3	55
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT. Arctic waterflood pipelines in Prudhoe Bay injection project require protection analysis—Charles L. Arnold	6-24	89
Soil stress assessment can prevent corrosion, reduce pipeline coating damage—Bing C. Yen and Glenn D. Tofani	8-26	63
British Gas has seamless pipe inspection program—Lawrence Jackson, Ernest Shannon, and G. A. Adey	9-9	147
Leak, rupture detection can be improved—Edward Gordon, R. E. Murphy, and P. D. Dean	11-4	84
OFFSHORE CONSTRUCTION REPORT. Highlander gets first subsea slug catcher for marginal-field development	11-11	58
Laboratory, test-loop analyses illustrate waxy crude-transport methods—Heinz G. Nicolai	11-18	132
Meters, Metering		
ANNUAL PIPELINE REPORT. Piston prover used to calibrate gas meters—H. Bellinga, A. Kooi, C. P. Hoeks, F. A. L. van Laak, and P. J. Orbons	8-19	89
Multiphase flow		
Pressures, temperatures predicted for two-pnase pipelines—M. G. Cawkwell and M. E. Charles	5-27	101
Slip velocity added to two-phase pipeline calculations—R. N. Maddox and Mohsen Vafaie Safti	6-17	94
ANNUAL PIPELINE REPORT. Model predicts liquid accumulation, severe terrain-induced slugging for two-phase lines—V. Goldzberg and F. McKee	8-19	105
Design methods for two-phase pipelines compared, evaluated—Mohammed E. Osman and Samy A. El-Feky	9-2	57
Condensate-line correlations for calculating holdup, friction compared to field data—Villiam Battarra, Oscar Mariani, Marco Gentilini, and Giancarlo Giacchetta	12-30	148
Offshore		
OFFSHORE SOUTHER CALIFORNIA REPORT. Miocene Monterey remains major challenge—Bob Williams	1-14	70
Sonar system aims to detect buried offshore pipelines	1-21	50
Pressures, temperatures predicted for two-phase pipelines—M. G. Cawkwell and M. E. Charles	5-27	101
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT. Arctic waterflood pipelines in Prudhoe Bay injection project require protection analysis—Charles L. Arnold	6-24	89
Riser design codes—1: Offshore pipeline design codes compared for loads, stress limits—Denny R. Stephens and Donald P. McConnell	7-15	128
Riser design codes—conclusion: Pipeline design codes compared graphically—Denny R. Stephens and Donald P. McConnell	7-29	139
Three gathering networks comprise northern North Sea gas system—George W. Crayston and P. A. Philpot	8-12	84
Subsea flowlines—1: J-tube pull-in theory is applied to North Sea's Troll multiple flowline bundles—G. J. Maten and M. Hales	9-23	138
Subsea flowlines—conclusion: Full-scale pull-in loads for multiple flowline bundles in North Sea's Troll field predicted—G. J. Maten and M. Hales	9-30	42
Oresund submarine pipeline—Sweden's access to North Sea gas—Max Eliasson, Jan Molin, and Jan Erik Janson	10-7	120
OFFSHORE CONSTRUCTION REPORT. Uptick due for U.K. North Sea pipelines—Warren R. True	11-11	55
OFFSHORE CONSTRUCTION REPORT. Highlander gets first subsea slug catcher for marginal-field development	11-11	58
OFFSHORE CONSTRUCTION REPORT. Soil, seismic studies essential for lines in earthquake areas—B. K. Jinsi	11-11	72
DEEPWATER TECHNOLOGY REPORT. Deepwater pipelay connects tower platform—William C. Lumpkin	12-2	60
DEEPWATER TECHNOLOGY REPORT. Industry group to study deepwater line connections—Warren R. True	12-2	98
Cathodic protection, coatings protect Statpipe system—S. Lund, H. T. Akten, R. T. Page, and K. A. Binns	12-23	47
Practices		
Drag-reducing agents—1: The basics of drag reduction—C. B. Lester	2-4	51
Drag-reducing agents—2: Here's how drag-reducing agent can outweigh looping or boosting	2-18	76
Drag-reducing agents: 3: How active, passive drag affect DRA injections—C. B. Lester	3-4	107
Drag-reducing agents—Conclusion: What to expect from and how to handle commercially available drag-reducing agents—C. B. Lester	3-11	116
Model changes improve compressor-station piping pressure-loss predictions—Timothy R. Meyer	4-29	96
Pumps		
Flexible inducer pumps can have wide operating range—Robert R. Ross and Pierre H. Fabeck	8-5	96
Stations		
Model changes improve compressor-station piping pressure-loss predictions—Timothy R. Meyer	4-29	96

	Date	Page
Storage		
OFFSHORE CONSTRUCTION REPORT. Classification group looks at floating production storage and offloading systems—David E. Jones and Gregory Shark	11-11	60
Strain gauge installed on Fulmar storage unit	12-30	43
Terminals		
Air strike heavilty damages Kharg Island terminal	9-30	23
OTHER TRANSPORTATION		
Offshore Mooring		
OFFSHORE REPORT. Simplified production-mooring system developed—Jean Arnaud, Rene Loire, Michel Pagezy, and Peter J. Piaseckyj	5-6	136
Tankers and Barges		
Transgulf charges marine shippers with harassment	1-28	70
OFFSHORE REPORT. Simplified production-mooring system developed—Jean Arnaud, Rene Loire, Michel Pigezy, and Peter J. Piaseckyj	5-6	136
Tanker casualty list lengthens in Iran Iraq war	6-17	68
Decline in fleet, route shifts seen for product tankers	12-30	57
TRANSPORTATION GENERAL		
TAPS to replace segment hit by subsidence	1-28	66
Proposed Lines and Expansion		
New Kansas gas pipeline plans start-up soon	1-7	48
OFFSHORE SOUTHERN CALIFORNIA REPORT. Miocene Monterey remains major challenge—Bob Williams	1-14	70
Only two U.S. coal slurry lines still on drawing boards	1-21	28
Northern Natural plans to start laying W. Texas CO_2 pipeline	2-4	42
Arkansas natural gas line planned	2-18	65
Iraq Turkey oil pipeline accord near	2-25	55
Houston Natural to extend gas pipeline in South Texas	3-11	66
Another trans-California gas pipeline proposed	3-25	48
Contract let for West Texas CO_2 line	3-25	48
U.S.S.R. plans major gas pipeline extension	4-1	46
Argentina, Brazil mull gas pipeline	4-8	50
Pipeline projects advance in several U.S. areas	4-22	46
Interprovincial eyes Beaufort Sea pipeline extension	4-22	67
Aussie region to get first crude oil pipeline	4-29	64
Iran revives plans for crude oil pipeline	4-29	64
Third gas pipeline proposed to California area	5-6	84
Larger scope eyed for Aussie gas line	5-6	84
MidCon plans Texas, Midwest pipeline work	5-20	40
Mobile Bay deep gas province due U.S. interstate system link	5-20	41
Williams system to install major fiber optic network	5-20	41
Celeron oil line construction to start in June	5-27	38
California gas pipeline proposals advancing	6-10	68
Texoma pipeline to be linked to NGPL system	6-17	63
Amadeus-Darwin gas line set for construction	7-8	30
Planned Arkansas gas line switches route	7-15	67
Chevron pipelines taking shape in Rocky Mountains	8-12	48
Two California pipeline projects may team up	8-12	50
ANNUAL PIPELINE REPORT. Texoma conversion aims at system safety—James C. Good	8-19	77
Texas Eastern system to grown in Pennsylvania, New Jersey	8-26	43
Texas Eastern plans system expansion	9-2	36
Contractors vie to lay Indian gas pipeline	9-9	84
Argentina to expand northern natural gas pipeline system	9-30	29
Pipeline project to boost gas use in India	10-21	38
Second intrastate gas system slated in eastern Arkoma basin	10-28	46
Joint venture kills Can-Am line project	11-25	34
Interprovincial sets more expansion of Canada-U.S. lines	11-25	38
Pollution Control		
Celeron takes steps to protect Texas aquifer	12-30	48

REFINING

ANALYSIS, Methods of		
MICROCOMPUTER REPORT. Microcomputer program converts TBP, ASTM, EFV distillation curves—Victor E. Arnold	2-11	55
Resid fuel-oil stability, cleanliness test improved—C.P.G. Lewis, R. Quillet, and T. Schreuder	4-8	73
Analysis improves catalytic reformer troubleshooting—J. T. Pistorius	6-10	146
Distillation unit design—1: Method quickly optimizes process design—A. I. Lygeros and K. G. Magoulas	8-26	55
Distillation unit design—(conclusion): Method sizes equipment and optimizes costs—A. I. Lygeros and K. G. Magoulas	9-9	129

	Date	Page
CALCULATOR/COMPUTER PROGRAMS		
Calculator program gives pressure-vessel characteristics—Larry Scott	2-4	60
Heat transfer, insulation calculations simplified—V. Ganapathy	8-19	125
Packed-tower program has special features—Tom C. Tsai	9-2	77
Program evaluates component and blend viscosities—Paul Huggins	10-28	122
CATALYSIS, CATALYSTS (Also see Cracking, Catalytic)		
FCC catalyst flow-problem predictions—M. F. Raterman	1-7	87
Catalyst increases COS conversion—Kenneth P. Goodboy	2-18	88
NPRA Q&A—1: Bigger role for catalysts in cat cracking	3-4	103
Pore size of FCC pretreat catalyst important—B. M. Moyse, A. Albjerg, and B. H. Cooper	3-11	111
NPRA Q&A—2: Hydroprocessing catalysts see tough service	3-25	112
NPRA Q&A—3: Cat reformer catalyst problems NPRA topic	4-15	73
FCC catalysts containing shape-selective zeolites boost gasoline octane number and yield—Stephen J. Yanik, Edward J. Demmel, Adrian P. Humphries, and Robert J. Campagna	5-13	108
REFINING TECHNOLOGY REPORT. Octane catalysts contain special sieves—J. S. Magee, W. E. Cormier, and G. M. Woltermann	5-27	59
REFINING TECHNOLOGY REPORT. Catalysts — key to low-cost isomerization—R. J. Schmidt, J. A. Weiszmann, and J. A. Johnson	5-27	80
Method predicts activity of vanadium-contaminated FCC catalysts—E. L. Leuenberger	7-15	125
Catalyst selection important for residuum hydroprocessing—R. L. Howell, C. Hung, K. R. Gibson, and H. C. Chen	7-29	121
WORLDWIDE CATALYST REPORT. Major increase in new catalysts logged—Richard A. Corbett	10-14	73
Sulfur and carbon deposition on Claus catalysts examined—Kenneth P. Goodboy, Judith C. Downing, and Hubert L. Fleming	11-4	89
More refining catalysts available—Richard A. Corbett	11-18	127
N_2 sweep speeds reformer start-up after regeneration—Paul L. Smithwick and Gary E. Diehl	11-25	104
Catalyst cooldown goes awry	12-23	52
Regenerating sulfur-poisoned reforming catalysts	12-23	53
COGENERATION		
California EOR, cogeneration sales are gas line targets	2-11	29
Two Texas cogeneration projects advancing	2-11	29
California cogeneration on the rise—Bob Williams	3-25	56
Gulf Coast cogeneration projects advancing	3-25	58
Refining cogeneration—1: Cogeneration plant margins predicted by performance models—Gordon V. Sims	12-16	105
Refining cogeneration—conclusion: Power-purchase pacts key to plant margins—Gordon V. Sims	12-23	44
COKING		
NPRA Q&A—4: Delayed coking operations examined	5-6	180
Shot coke: its origins and prevention—Norman P. Lieberman	7-8	45
Combined hydrocracking, coking aids bitumen upgrading—Jim Hilsenteger, Brian Lines, and Paul Mankowski	8-19	132
COMPUTERS/MICROCOMPUTERS		
MICROCOMPUTER REPORT. Microcomputer program converts TBP, ASTM, EFV distillation curves—Victor E. Arnold	2-11	55
ANNUAL REFINING ISSUE. End-user computing highlighted at NPRA conference Q&A session	3-18	114
CONSTRUCTION METHODS		
Guyless lift system erects Flexicoker vessels	7-22	94
CONSTRUCTION		
WORLDWIDE CONSTRUCTION REPORT. Refineries—Ailleen Cantrell	4-22	96
Chinese refinery set for construction	5-20	34
WORLDWIDE CONSTRUCTION REPORT. Refineries—Ailleen Cantrell	10-21	85
U.S. refiners press work on projects at 32 sites—Michael Obel	10-28	50
COSTIMATING, Quarterly		
Quarterly costimating: How indexes have risen—G. L. Farrar	1-7	98
Quarterly costimating: How Nelson indexes have risen—G. L. Farrar	4-1	116
Quarterly costimating: How indexes have risen—G. L. Farrar	7-1	48
Quarterly costimating: How indexes have risen—Gerald L. Farrar	10-7	114
COSTS		
Major study reveals EEC gas oil desulfurization costs—G. J. Waller, M. C. Conrard, G. Cremer, J. W. J. Koenig, H. M. Opitz, J. P. Queme, P. Sibra, R. Th. Sobel, and J. M. L. M. Vlemmings	1-21	55
Refinery economics affected by FCC impact on alkylation—G. W. G. McDonald	4-1	111
Coal to cut steam generation costs for Quaker State	7-29	61
Conoco seeks to cut Ponca City costs	7-29	64
Refiners' crude oil costs remain low	8-19	54
Distillation unit design (conclusion): Method sizes equipment and optimizes costs—A. I. Lygeros and K. G. Magoulas	9-9	129
Flare-system operating costs can be reduced—Richard A. Corbett	9-23	136
COSTS (Nelson Cost Indexes) by G. L. Farrar		
Nelson Cost Index	1-7	86
Nelson Cost Index	2-4	67
Nelson Cost Index	3-4	120
Nelson Cost Index	4-1	115
Nelson Cost Index	5-6	204
Nelson Cost Index	6-3	77
Nelson Cost Index	7-1	55
Nelson Cost Index	8-5	102
Nelson Cost Index	9-2	76
Nelson Cost Index	10-7	142
Nelson Cost Index	11-4	98
Nelson Cost Index	12-2	115
How Nelson cost indexes are compiled	12-30	145
CRACKING, Catalytic		
Bag sampling aids FCCU studies—A. Johnson and I. P. Fisher	2-11	98
NPRA Q&A—1: Bigger role for catalysts in cat cracking	3-4	103
Pore size of FCC pretreat catalyst important—B. M. Moyse, A. Albjerg, and B. H. Cooper	3-11	111
Refinery economics affected by FCC impact on alkylation—G. W. G. McDonald	4-1	111
FCCU revamp allows higher temperature operation—P. E. Glasgow	4-29	71
FCC catalysts containing shape-selective zeolites boost gasoline octane number and yield—Stephen J. Yanik, Edward J. Demmel, Adrian P. Humphries, and Robert J. Campagna	5-13	108
Combined cracking processes boost fuel yields from low-quality crudes and residua—T. E. Johnson, J. R. Murphy, and K. G. Tasker	7-1	50
Mild hydrocracking of FCC feeds produces yield benefits in mid-distillates, gasoline—Pankaj H. Desai, Mehmet Y. Asim, Frans W. van Houtert, and Pieter J. Nat	7-22	106
Four main FCC factors affect octane—Hans U. Andreasson and Lawrence L. Upson	8-5	91
Modular system cleans up FCC fuel gas—Herbert W. Wizig	8-12	78
FCCU regenerator temperature effects evaluated—Lewis C. Yen, Richard E. Wrench, and Chia Ming Kuo	9-16	87
FCC heat balance critical for heavy fuels—J. L. Mauleon and J. C. Courcelle	10-21	64
FCCU flue-gas scrubber experience updated—D. Hartley and J. D. Cunic	11-18	154
CRUDES		
OFFSHORE SOUTHERN CALIFORNIA REPORT. Miocene Monterey remains major challenge—Bob Williams	1-14	70
Guide to export crudes for the '80s—Two high-quality offshore crude oils, Sharjah Condensate and Margham Light, are assayed—Richard A. Corbett	7-8	54
Arabian crude-oil residues evaluated—Mohammad Farhat Ali, Misbah Hasan, Ahmed Bukhari, and Mohammad Saleem	8-12	71
DISTILLATION (Also see Fractionation)		
Distillaton unit design—1: Method quickly optimizes process design—A. I. Lygeros and K. G. Magoulas	8-26	55
Distillaton unit design (conclusion): Method sizes equipment and optimizes costs—A. I. Lygeros and K. G. Magoulas	9-9	129
New pseudo-critical pressure equations improve predictions—Robert Hlavin	12-9	58
ENERGY CONSERVATION		
REFINING TECHNOLOGY REPORT. Surveys show more energy reduction still possible—Roger O. Pelham and Richard D. Moriarty	5-27	65
Flare-system operating costs can be reduced—Richard A. Corbett	9-23	136
Heat-recovery boiler design for cogeneration, process applications covers many parameters—V. Ganapathy	12-2	116
EQUIPMENT		
Simplifying reboiler entrainment calculations—Ben Tammami	7-15	134
Distillation unit design—1: Method quickly optimizes process design—A. I. Lygeros and K. G. Magoulas	8-26	55
Distillation unit design (conclusion): Method sizes equipment and optimizes costs—A. I. Lygeros and K. G. Magoulas	9-9	129
Surplus units can be energy and cost efficient	9-16	114
Operating experience confirms draft controller value—Gary D. Davis	9-30	55
CONTROL VALVE REPORT. New products appear even as valve industry restructures—Hans D. Baumann	12-16	73
CONTROL VALVE REPORT. Criteria given for sizing and selection of control valves—Donald Kohan	12-16	76
CONTROL VALVE REPORT. Pneumatic valve actuator designs detailed—Alexander B. Scott	12-16	82
CONTROL VALVE REPORT. New control valve improves operating characteristics—Richard A. Corbett	12-16	92
CONTROL VALVE REPORT. Cryogenic control-valve selection is exacting—Frank George Kerry	12-16	96
CONTROL VALVE REPORT. Test system spots MOV degradation—Arthur Charbonneau	12-16	102
FIRES, FLOODS, OTHER DISASTERS		
Blasts, fire hit Gulf Coast storage	11-11	38
Reformer explodes at ARCO's Watson refinery	12-16	68

	Date	Page
FORECASTS, TRENDS, STATISTICS, SURVEYS		
Refiners split over EPA's lead bank proposal	1-28	81
Future gloomy for refining industry in western Europe—Roger Vielvoye	3-18	41
ANNUAL REFINING ISSUE. U.S. refining capacity resumes decline—Richard A. Corbett	3-18	89
ANNUAL REFINING ISSUE. Refinery blends gasoline for the unleaded era—Curt S. Benefield and Robert R. Broadway	3-18	92
ANNUAL REFINING ISSUE. Gasoline compositions in no-lead era—William E. Morris	3-18	99
ANNUAL REFINING ISSUE. Refiners mull no-lead options—S. F. Culberson, G. L. Yepson, and K. D. Bartholomew	3-18	108
ANNUAL REFINING ISSUE. Annual refining survey—Aileen Cantrell	3-18	122
Refiners pressed by gasoline lead cuts	4-1	62
More woes seen for some refiners	4-22	50
WORLDWIDE CONSTRUCTION REPORT. Refineries—Aileen Cantrell	4-22	96
Small U.S. refiners cite product imports threat	5-20	50
U.S. in no rush to rescue small refiners hurt by product imports—Patrick Crow	5-27	25
Study sees slicing of refining capacity	5-27	30
U.S. refiners fret over octane requirements	5-27	32
REFINING TECHNOLOGY REPORT. Surveys show more energy reduction still possible—Roger O. Pelham and Richard D. Moriarty	5-27	65
Big refining boosts set for Oapec countries—S. Akashah and A. M. Abushihada	6-17	101
Part of New Jersey refinery back on stream	7-1	25
Texas Gulf Coast refiners build bank of lead credits	7-1	26
U.S. refiners plan slight capacity increase	7-22	51
Feedstock, product versatility the key to U.S. refinery profits—Michael Obel	7-29	59
Worldwide sulfur derived from oil and gas—Aileen Cantrell	9-16	117
U.S. refiners bank 3.3 billion g of lead rights	9-23	58
WORLDWIDE CATALYST REPORT. Major increase in new catalysts logged—Richard A. Corbett	10-14	73
WORLDWIDE CONSTRUCTION REPORT. Refineries—Aileen Cantrell	10-21	85
Tight margins seen persisting for U.S. refiners	10-28	51
Big singapore refining center faces sharp drop in crude runs—Roger Vielvoye and Michael Obel	11-18	57
Stocks to play smaller role in meeting winter fuel demand—Bob Beck	12-2	27
OCAW, oil companies negotiate contracts that expire early in '86—Michael Obel	12-16	43
Foreign trade zone includes refineries	12-16	69
CONTROL VALVE REPORT. New products appear even as valve industry restructures—Hans D. Baumann	12-16	73
U.S. refiners poised for move into next lead phasedown step—Michael Obel	12-23	15
WORLDWIDE REPORT. Survey of operating refineries worldwide—Aileen Cantrell	12-30	100
WORLDWIDE REPORT. Worldwide refining—Aileen Cantrell	12-30	102
How Nelson cost indexes are compiled—Gerald L. Farrar	12-30	145
FUELS, Diesel		
Interaction blending approach works for diesel, fuel oil—William E. Morris	9-23	119
FUELS, Gasoline		
Kuwait Petroleum moving to market unleaded gasoline	1-14	53
Refiners split over EPA's lead bank proposal	1-28	81
Methanol cannot economically dislodge gasoline—Laurence H. Cohen and Herman L. Muller	1-28	119
EPA orders gasoline lead phasedown	3-11	56
ANNUAL REFINING ISSUE. Refinery blends gasoline for the unleaded era—Curt S. Benefield and Robert R. Broadway	3-18	92
ANNUAL REFINING ISSUE. Gasoline compositions in no-lead era—William E. Morris	3-18	99
Refiners pressed by gasoline lead cuts	4-1	62
Chrysler official outlines fuel needs	4-1	62
U.S. refiners fret over octane requirements	5-27	32
Lead phasedown seen hiking naphtha options	6-3	47
California study endorses methanol	6-17	70
Texas Gulf Coast refiners build bank of lead credits	7-1	26
Mild hydrocracking of FCC feeds produces yield benefits in mid-distillates, gasoline—Pankaj H. Desai, Mehmet Y. Asim, Frans W. van Houtert, and Pieter J. Nat	7-22	106
Reduction studied for U.S. auto fuel economy standard	8-19	46
U.S. refiners bank 3.3 billion g of lead rights	9-23	58
Interaction blending approach works for diesel, fuel oil—William E. Morris	9-23	119
U.S. refiners poised for move into next lead phasedown step—Michael Obel	12-23	15
FUELS, General		
California study endorses methanol	6-17	70
FURNACES		
Heat-recovery boiler design for cogeneration, process applications covers many parameters—V. Ganapathy	12-2	116
New pseudo-critical pressure equations improve predictions—Robert Hlavin	12-9	58

	Date	Page
HEAT TRANSFER		
Heat transfer, insulation calculations simplified—V. Ganapathy	8-19	125
HYDROCRACKING		
Mild hydrocracking of FCC feeds produces yield benefits in mid-distillates, gasoline—Pankaj H. Desai, Mehmet Y. Asim, Frans W. van Houtert, and Pieter J. Nat	7-22	106
Combined hydrocracking, coking aids bitumen upgrading—Jim Hilsenteger, Brian Lines, and Paul Mankowski	8-19	132
HYDROREFINING		
Catalyst selection important for residuum hydroprocessing—R. L. Howell, C. Hung, K. R. Gibson, and H. C. Chen	7-29	121
HYDROTREATING		
NPRA Q&A—2: Hydroprocessing catalysts see tough service	3-25	112
ISOMERIZATION		
REFINING TECHNOLOGY REPORT. Catalysts—key to low-cost isomerization—R. J. Schmidt, J. A. Weiszmann, and J. A. Johnson	5-27	80
Idle catalytic reformer can be converted to isomerization unit or jet-fuel treater—D. D. Cobb and D. G. Chapel	6-3	60
MAINTENANCE		
Correlations for design, evaluation of packed vacuum towers—Kenneth Graf	5-20	60
Shot coke: its origins and prevention—Norman P. Lieberman	7-8	45
N_2 sweep speeds reformer start-up after regeneration—Paul L. Smithwick and Gary E. Diehl	11-25	104
MANAGEMENT		
ANNUAL REFINING ISSUE. Refiners mull no-lead options—S. F. Culberson, G. L. Yepson, and K. D. Bartholomew	3-18	108
Lead-phasedown problems not restricted to refiners—L. Douglas Smith	6-24	95
OCTANES		
ANNUAL REFINING ISSUE. Refinery blends gasoline for the unleaded era—Curt S. Benefield and Robert R. Broadway	3-18	92
ANNUAL REFINING ISSUE. Gasoline compositions in no-lead era—William E. Morris	3-18	99
ANNUAL REFINING ISSUE. Refiners mull no-lead options—S. F. Culberson, G. L. Yepson, and K. D. Bartholomew	3-18	108
FCC catalysts containing shape-selective zeolites boost gasoline octane number and yield—Stephen J. Yanik, Edward J. Demmel, Adrian P. Humphries, and Robert J. Campagna	5-13	108
REFINING TECHNOLOGY REPORT. Octane catalysts contain special sieves—J. S. Magg, W. E. Cormier, and G. M. Woltermann	5-27	59
Lead-phasedown problems not restricted to refiners—L. Douglas Smith	6-24	95
Four main FCC factors affect octane—Hans U. Andreasson and Lawrence L. Upson	8-5	91
PLANT CLOSURES		
BP to close two West German refineries	2-11	28
BP to shut down second U.K. refinery	4-15	28
Part of New Jersey refinery back on stream	7-1	25
More European refinery shutdowns seen	7-22	51
Royal Dutch/Shell to close Curacao refinery	8-12	65
Group plans to restart California refinery	10-28	52
Esso to consider refinery shutdown at Sarnia, Ontario	11-11	50
PLANT CONSTRUCTION (New Refineries)		
Fiftieth CCR reformer goes on stream in Germany	3-18	144
PLANT EXPANSION		
Tenneco revamps Chalmette refinery—W. E. Heck and Ralph Ragsdale	1-14	79
Groups to bid on refinery expansion work in Thailand	1-28	73
Amoco to add Texas City alkylation unit	3-4	66
Dutch processing plants due revamp	3-18	44
Texaco plans upgrading of Ontario refinery	7-22	60
Upgrade advances at Scottish refinery	7-29	68
Cogeneration plant under construction for Tosco refinery	8-5	51
Revamp of big Spanish refinery complete	9-9	72
Revamp project under way at Regina refinery	10-7	52
Refinery projects pushed in Europe, Africa, Asia	11-18	61
Esso completes turnaround of cat cracker at Fawley	12-2	40
Sun completes big Toledo refinery turnaround	12-9	28
Texas refinery slated to get two new units	12-23	19
Shell U.K. to replace cracker at Stanlow	12-23	20
PLANT PRACTICES		
Sun hikes Marcus Hook refinery product margins	11-11	30
PLANTS, General		
Soviets' Chimkent refinery starts up	3-11	44
Al-Jubail refinery starts full operations	8-19	59
Shell sells Curacao refinery to government	10-14	69
Group plans to restart California refinery	10-28	52
Small refinery to reopen in W. Oklahoma	11-11	33
Esso to consider refinery shutdown at Sarnia, Ontario	11-11	50

POLLUTION CONTROL

	Date	Page
U.S. refiners press work on projects at 32 sites—Michael Obel	10-28	50

PROCESSES

	Date	Page
Coil-design visbreaker for HGO recovery has advantages—John R. Wood	4-22	80
Correlations for design, evaluation of packed vacuum towers—Kenneth Graf	5-20	60
REFINING TECHNOLOGY REPORT. Economics right for MTBE from field butanes	5-27	92
Combined hydrocracking, coking aids bitumen upgrading—Jim Hilsenteger, Brian Lines, and Paul Mankowski	8-19	132
Distillation unit design—1: Method quickly optimizes process design—A. I. Lygeros and K. G. Magoulas	8-26	55
Distillation unit design (conclusion): Method sizes equipment and optimizes costs—A.I. Lygeros and K. G. Magoulas	9-9	129
Claus plant capacity boosted by oxygen-enrichment process—B. Gene Goar, W. P. Hegarty, R. Davis, and R. Kammiller	9-30	39

PUMPS

	Date	Page
Backflow control improves pump performance—C. C. Heald and R. Palgrave	2-25	96

REFORMING, Catalytic

	Date	Page
Fiftieth CCR reformer goes on stream in Germany	3-18	144
NPRA Q&A—3: Cat reformer catalyst problems NPRA topic	4-15	73
Idle catalytic reformer can be converted to isomerization unit or jet-fuel treater—D. D. Cobb and D. G. Chapel	6-3	60
Analysis improves catalytic reformer troubleshooting—J. T. Pistorius	6-10	146

RESEARCH

	Date	Page
Bag sampling aids FCCU studies—A. Johnson and I. P. Fisher	2-11	98
Simplifying reboiler entrainment calculations—Ben Tammami	7-15	134

RESID/HEAVY OIL PROCESSING

	Date	Page
Tenneco revamps Chalmette refinery—W. E. Heck and Ralph Ragsdale	1-14	79
Resid fuel-oil stability, cleanliness test improved—C. P. G. Lewis, R. Quillet, and T. Schreuder	4-8	73
Canadian heavy oil upgrader advancing	4-22	61
Combined cracking processes boost fuel yields from low-quality crudes and residua—T. E. Johnson, J. R. Murphy, and K. G. Tasker	7-1	50
Catalyst selection important for residuum hydroprocessing—R. L. Howell, C. Hung, K. R. Gibson, and H. C. Chen	7-29	121
Arabian crude-oil residues evaluated—Mohammad Farhat Ali, Misbah Hasan, Ahmed Bukhari, and Mohammad Saleem	8-12	71
FCC heat balance critical for heavy fuels—J. L. Mauleon and J. C. Courcelle	10-21	64

STORAGE

	Date	Page
Long-storage effect on crude, products studied	7-22	79

SULFUR

	Date	Page
Major study reveals EEC gas oil desulfurization costs—G. J. Waller, M. C. Conrard, G. Cremer, J. W. J. Koenig, H. M. Opitz, J. P. Queme, P. Sibra, R. Th. Sobel, and J. M. L. M. Vlemmings	1-21	55
WORLDWIDE CONSTRUCTION REPORT. Sulfur—Ailleen Cantrell	4-22	117
Worlwide sulfur derived from oil and gas—Ailleen Cantrell	9-16	117
WORLDWIDE CONSTRUCTION REPORT. Sulfur—Ailleen Cantrell	10-21	100
Sulfur and carbon deposition on Claus catalysts examined—Kenneth P. Goodboy, Judith C. Downing, and Hubert L. Fleming	11-14	89

PETROCHEMICAL

COMPUTERS/MICROCOMPUTERS

	Date	Page
MICROCOMPUTER REPORT. Process training simulators save in start-up and operations—David C. Pathe	2-11	74
Sizing a vertical separator by microcomputer—Tom C. Tsai	2-25	113

COOLING TOWERS

	Date	Page
Cooling towers—neglected energy resource—Robert Burger	4-15	53

COSTS

	Date	Page
AGA: U.S. to hold edge in ammonia plant costs	8-12	51

ENERGY CONSERVATOIN

	Date	Page
Recompression can save etnylene plant energy	3-11	126
ANNUAL PETROCHEMICAL ISSUE. Temperature monitoring system saves its price in under a year—Ray Gardner	3-25	76

EQUIPMENT

	Date	Page
Surplus units can be energy and cost efficient	9-16	114

ETHYLENE

	Date	Page
Recompression can save ethylene plant energy	3-11	126
Mossmorran ethylene cracker near start-up	7-29	66
Du Pont to reduce ethylene capacity at Chocolate Bayou	8-26	37
ETHYLENE REPORT. New capacity forces ethylene producers to aim for lower cost, flexibility—Ted Wett	9-2	39
ETHYLENE REPORT. Polymer demand could quickly soak up new olefin output—Ted Wett	9-2	44
ETHYLENE REPORT. Balance ethylene product slate, cut costs—Ted Wett	9-2	46
ETHYLENE REPORT. Coking simulation aids on-stream time—E. Ranzi, M. Dente, S. Pierucci, S. Barendregt, and P. Cronin	9-2	49
ETHYLENE REPORT. Hydrocarbon leak detector keeps ethylene plant on stream—D. R. Malec and D. L. Peters	9-2	53
Growth seen for ethylene, propylene	10-21	36

FORECASTS, TRENDS STATISTICS, SURVEYS

	Date	Page
No big jolt seen from new petrochem entrants	1-7	68
Expanded butylene derivatives sales seen	2-4	32
U.S. ammonia industry sees end to 5 year downturn—G. Alan Petzet and Michael Obel	2-11	25
ANNUAL PETROCHEMICAL ISSUE. Saudi petrochem complexes make debut—Ted Wett	3-25	71
ANNUAL PETROCHEMICAL ISSUE. Stop-and-go recovery tempers petrochemical construction—Ted Wett	3-25	80
WORLDWIDE CONSTRUCTION REPORT. Petrochemicals—Ailleen Cantrell	4-22	104
Rapid growth seen for Lldpe demand	5-20	42
AGA: U.S. to hold edge in ammonia plant costs	8-12	51
ETHYLENE REPORT. New capacity forces ethylene producers to aim for lower cost, flexibility—Ted Wett	9-2	39
ETHYLENE REPORT. Polymer demand could quickly soak up new olefin output—Ted Wett	9-2	44
ETHYLENE REPORT. Balance ethylene product slate, cut costs—Ted Wett	9-2	46
Growth seen for ethylene, propylene	10-21	36
WORLDWIDE CONSTRUCTION REPORT. Petrochemicals—Ailleen Cantrell	10-21	92
Petrochem projects progress in 10 countries	11-18	62

I[illegible]TRUMENTATION, Control

	Date	Page
Smooth, early startup to control system—U. G. Jackson	4-22	85

MAINTENANCE

	Date	Page
ETHYLENE REPORT. Coking simulation aids on-stream time—E. Ranzi, M. Dente, S. Pierucci, S. Barendregt, and P. Cronin	9-2	49
ETHYLENE REPORT. Hydrocarbon leak detector keeps ethylene plant on stream—D. R. Malec and D. L. Peters	9-2	53

MANAGEMENT

	Date	Page
MICROCOMPUTER REPORT. Process training simulators save in start-up and operations—David C. Pathe	2-11	74
ANNUAL PETROCHEMICAL ISSUE. Novel organization working at Shell Canada facility—Norm Halpern	3-25	88
ETHYLENE REPORT. Balance ethylene product slate, cut costs—Ted Wett	9-2	46

PLANTS

	Date	Page
ANNUAL PETROCHEMICAL ISSUE. Saudi petrochem complexes make debut	3-25	71
Unipol plant complete at Texas complex	4-8	62
Cogeneration due at Chocolate Bayou petrochemical site	7-1	33
Kellogg: Idemitsu plant boosts olefins process	7-15	60
Mossmorran ethylene cracker near start-up	7-29	66
Du Pont to reduce ethylene capacity at Chocolate Bayou	8-26	37
Contractors vie to construct Thai petrochem complex	10-14	64

PLANT PRACTICES

	Date	Page
Recompression can save ethylene plant energy	3-11	126
ANNUAL PETROCHEMICAL ISSUE. Novel organization working at Shell Canada facility—Norm Halpern	3-25	88

PROCESSES

	Date	Page
Process integration can provide flexibility for lower olefins production—A. J. Bassler, B. V. Pano, and E. S. Chong	9-16	96
UOP licenses new styrene technology	11-4	50
Lyondell project combines two processes	11-25	38
MMA process shows economic promise—A. S. Bakshi	11-25	99

PRODUCTS

	Date	Page
ANNUAL PETROCHEMICAL ISSUE. Yield correlations for AGO cracking are reliable—Tom C. Tsai	3-25	96
Chevron sees growth in polystyrene market	7-15	50
Process integration can provide flexibility for lower olefins production—E. J. Bassler, B. V. Pano, and E. S. Chong	9-16	96
Metathesis can widen lower olefin product choices	9-16	100

SAFETY

	Date	Page
ETHYLENE REPORT. Hydrocarbon leak detector keeps ethylene plant on stream—D. R. Malec and D. L. Peters	9-2	53
Catalyst cooldown goes awry	12-23	52

STORAGE

	Date	Page
Ethylene terminal planned off Egypt	10-7	62

WASTE DISPOSAL

	Date	Page
Sidestream softening system cuts petrochem plant's effluent—Jack V. Matson, Wendy G. Mouche, and Eric Rosenblum	5-20	76
Waste treatment systems studied for petchem sites	8-5	39

INTERNATIONAL

ABU DHABI

	Date	Page
Khuff drilling—1: ADCO improves deep Khuff drilling—F. A. Samhouri and A. M. Al-Chalabi	1-7	73
Khuff drilling—Conclusion: Program overcomes heat, pressure, sour gas—F. A. Samhouri and A. M. Al-Chalabi	1-14	91
KOH/lignosulfonate mud controls Laffan, Nahr Umr/Wasia shales off Abu Dhabi—Lindsey Fraser	10-14	124

ADRIATIC SEA

	Date	Page
Elf group plans development of heavy oil field in Adriatic	6-17	72

AFRICA (General)

	Date	Page
Refinery projects pushed in Europe, Africa, Asia	11-18	61

ANGOLA (Offshore)

	Date	Page
Texaco group scores again off Angola	1-14	41
Texao group to develop field off Angola	8-5	30
Texaco scores, plans development off Angola	11-25	33
Elf combine plans oil production hike in fields off Angola	12-2	34

ARCTIC

	Date	Page
Spitsbergen area exploration programs pick up—Roger Vielvoye	2-4	40
Soviets christen first of two Arctic class jack up rigs	2-4	41
Panarctic plans limited Arctic drilling program	2-11	34
Soviet Union plans to assess Arctic discovery drilled in 1948	4-22	66
Arctic Island wildcat yields oil and gas	5-27	40
NORTH AMERICAN ARCTIC REPORT. Canadian Arctic production prospects brighten	8-5	57
NORTH AMERICAN ARCTIC REPORT. PIP phaseout pushes Canadian frontier outlay	8-5	60
Arctic oil shipment headed for Montreal	9-9	62
Arctic Islands oil arrives at Montreal	9-23	46
Soviet Union starts shipping Arctic crude oil	11-4	59

ARGENTINA

	Date	Page
Argentina renegotiates two production pacts	4-1	67
Argentina, Brazil mull gas pipeline	4-8	50
Argentina seeks takers for onshore, offshore acreage	7-8	28
Argentina, China, Tanzania gas projects backed	7-8	30
Total to develop Hidra field off Argentina	8-12	52
Argentina outlines terms of new model contract	9-16	75
Argentina to expand northern natural gas pipeline system	9-30	29

ASIA/PACIFIC

	Date	Page
W. Pacific Basin condensate, naphtha glut seen	4-8	43
Refinery projects pushed in Europe, Africa, Asia	11-18	61

AUSTRALIA

	Date	Page
Aussie onshore exploration to have brisk year	2-11	42
Australia to offer cash bid tracts in Timor Sea	3-18	53
Exxon unit, BHP to develop Bream oil field	4-1	46
Australian LNG export project at critical stage	4-22	46
Aussie region to get first crude oil pipeline	4-29	64
Larger scope eyed for Aussie gas line	5-6	84
Policies seen threatening Aussie oil, gas work	5-6	97
Australia pushes revamp of petroleum policies	5-13	66
Australia offers 14 permits in Timor Sea area	5-13	67
Researchers find oil and gas shows in Aussie frontiers	6-24	42
Amadeus-Darwin gas line set for construction	7-8	30
Aussies cut import parity price of crude oil	7-8	34
Contractor named for Australian LNG project	7-29	71
Carpentaria basin: a regional analysis—I. R. Burgess	7-29	180
Australian exploration activity remains strong	8-12	57
Australia changing work program system	8-26	33
Aussie group mulls sites for ammonia plant	8-26	42
Four Timor Sea area permits awarded by Australia	9-23	56
Pipeline projects advance in Australia	9-23	66
Oil, gas producers fight proposals in Australia	11-4	58
Industry loses battle against Aussie cash bids	11-18	69
Pact could lead to more S. Australia exploration	11-25	43
Mereenie crude oil pipeline completed ahead of schedule	11-25	49
Woodside obtains NW Shelf project loan	12-2	33
How the Dampier-to-Perth pipeline was commissioned—David A. Hesse	12-9	39

AUSTRALIA (Offshore)

	Date	Page
Australia offers 14 permits in Timor Sea area	5-13	67
First platform to be installed off W. Australia	6-10	64
Four Timor Sea area permits awarded by Australia	9-23	56
BHP's Jabiru field project advances off Australia	12-2	51
Oil slated to flow from field off W. Australia	12-23	24
Six exploration permits offered off Western Australia	12-30	44

BALTIC SEA

	Date	Page
Baltic Sea strike due detailed study	11-18	77
Soviet's Baltic Sea scheduled for first ice resistant platform	12-23	23

BANGLADESH

	Date	Page
Bangladesh to appraise three natural gas fields	5-20	51
Less developed countries push campaigns to tap natural gas—Marcia A. Parker	6-10	57

BENIN

	Date	Page
Benin hydrocarbon potential looks promising—Arid Elvsborg and Jaques Dalode	2-11	126

BLACK SEA

	Date	Page
Romania to tap its first field in Black Sea	8-5	48
Success eludes Bulgaria's Black Sea search	8-5	49

BRAZIL

	Date	Page
How South Atlantic rifting affects Brazilian oil reserves distribution—Peter Szatmari, Edson Milani, Marcos Lana, Joao Conceicao, and Antonio Lobo	1-14	107
Oil, gas potential of Brazil's Pelotas basin—Samuel T. Pees and Patrick J. V. Delaney	2-18	117
Geology of Brazil's Atlantic margin basins—Modesto Victor Dauzacker, Hannfried Schaller, Augusto Canellas M. Castro Jr., and Murilo Marroquim de Souza	3-4	142
Argentina, Brazil mull gas pipeline	4-8	50
Energy issues press Brazil's new administration	4-15	44
Less developed countries push campaigns to tap natural gas—Marcia A. Parker	6-10	57
Petrobras stock to be offered to public	11-11	28
BP earmarks funds for Brazilian search	11-25	36

BRAZIL (Offshore)

	Date	Page
Petrobras: Campos basin oil strike may be a giant field	5-6	90
Petrobras gauges oil at confirmation of deepwater strike	9-30	34

BULGARIA

	Date	Page
Success eludes Bulgaria's Black Sea search	8-5	49

BURMA

	Date	Page
Burma to consider Martaban field development	6-3	29

CANADA

	Date	Page
Texaco Canada buys Canadian Reserve for $495 million	1-7	61
Alberta industry shows 1984 rebound	1-7	68
Shell Canada: Industry rebound due in 1985	1-7	70
Talks extended on Canadian LNG project	1-7	70
NEB opposes $2.30/Mcf gas export price	1-7	70
Alberta orders January light oil production cut	1-21	33
Canada moving to capture bigger slice of U.S. gas market	1-28	57
Economic advisory group calls for TransCanada breakup	1-28	62
Esso eyes expansion of oil sands project	1-28	72
Canada reduces tax on oil exports to U.S.	2-4	37
Canadian LNG project loses one customer	2-11	30
Canadian gas exports show increase	2-11	46
Chevron, Texaco takeovers of Canada companies okayed	2-18	53
Ottawa, Newfoundland sign offshore pact	2-18	57
Canada sees 17.5% gain in gas exports to U.S.	2-18	58
Gulf busily drilling B.C. area	2-18	134
Canadian industry to boost capital spending	2-25	48
Alberta removes lid on oil production	2-25	49
Texaco starts Alberta miscible floods	2-25	60
Pan-Alberta gas exports show big gain	3-4	66
Price paid for Petrofina Canada at issue	3-18	65
Canada pays $1.7 billion in frontier grants	3-25	46
Canadian exports show 1984 increase	3-25	54
ANNUAL PETROCHEMICAL ISSUE. Novel organization working at Shell Canada facility—Norm Halpern	3-25	88
Canadian line-inspection procedures detailed—R. M. Jamieson	3-25	107
Canadian oil, gas to be freed of price ceiling, some taxes	4-8	38
TransCanada revamps plan to hike gas exports	4-8	44
Sulfur recovery hiked in Claus/Sulfreen units at Ram River—Robert S. Coward and Warren M. Skaret	4-8	86
Canada eyes hike in heavy crude output	4-15	31
Canada expects oil investment surge	4-15	38
Canada's frontier, offshore action up	4-15	38
Canada's 1984 drilling hits record level	4-22	53
Canadian heavy oil upgrader advancing	4-22	61

	Date	Page
Polysar to acquire full interest in Petrosar	4-22	61
Interprovincial eyes Beaufort Sea pipeline extension	4-22	67
Alberta to rely on oil sands, heavy oil	4-29	57
More Canadian gas destined for U.S.	4-29	65
Mackenzie-Beaufort seen near development	5-6	81
Canada adjusts frontier reserves estimates	5-13	68
Gulf: Higher prices, better tax deal needed in frontiers	5-20	33
Murphy plans Alberta heavy oil project	5-20	42
Mobil eyes 1991 start of Hibernia oil production	5-27	34
Devonian reef strike tested in Northwest Alberta	5-27	36
Jamaican oil work due Canadian aid	5-27	36
Arctic Island wildcat yields oil and gas	5-27	40
Firm to acquire control of Gulf Canada	6-3	31
Esso Cold Lake, Alta., heavy oil project okayed	6-3	34
Canadian operator details internal inspection program—Gary C. Robinson	6-3	55
Expander-gas processing plant converted to boost C_3 recovery at Canada's Judy Creek—Shuaib A. Khan	6-3	78
Canada hopes for frontier policy by fall	6-10	65
Amoco plans dry gas cycling project in Alberta	6-17	74
Increasing volumes of Canadian gas seen U.S. bound	6-17	83
Algoma to resume construction of Canada tube mill	6-24	38
Alberta to review oil proration policies, shutins	7-1	26
Canmar's berm-supported SSDC drilling advances arctic technology—Kevin J. Hewitt, William E. Berzins, John P. Fitzpatrick, and Harry G. Hogeboom	7-1	39
Alberta unveils upstream incentives	7-8	25
Mobil cuts estimate of Venture reserves	7-8	35
Husky schedules heavy oil pilot in eastern Alberta	7-22	52
Application filed for first exports of Venture gas	7-22	57
Texaco plans upgrading of Ontario refinery	7-22	60
Clearinghouse eyes spot sales of Canadian gas	7-29	65
Canadian industry responds to about-face on energy policy	8-5	25
Shell finds more CO_2 in SE British Columbia	8-5	50
NORTH AMERICAN ARCTIC REPORT: Canadian Arctic production prospects brighten	8-5	57
NORTH AMERICAN ARCTIC REPORT: PIP phaseout pushes Canadian frontier outlay	8-5	60
Deal reinstated for purchase of Gulf Canada Ltd.	8-12	46
State firm to buy big part of Gulf Canada assets	8-19	66
ANNUAL PIPELINE REPORT: Pipeline in Canada's far north in service—A. R. Pick and J. D. Smith	8-19	71
Shell to convert Montreal-Portland line for gas exports	8-26	34
Salomon Bros. pinpoints hike in Canadian netbacks	9-2	26
Petrocan's Gulf purchase draws fire, defense	9-2	26
Two Canadian heavy oil projects advance	9-2	36
Port planned to serve operations in Beaufort Sea	9-2	36
Canada lists increase in liquids, gas reserves	9-2	37
Hibernia construction sites designated	9-2	37
Arctic oil shipment headed for Montreal	9-9	62
Venture gas due separate export hearing	9-9	83
Petrocan's Gulf purchase to be probed	9-16	66
IPAC: No accord likely on natural gas decontrol	9-16	73
Arctic islands oil arrives at Montreal	9-23	46
Revamp project under way at Regina refinery	10-7	52
Alberta's ERCB increases shut-in order to 127,000 b/d	10-7	59
Another heavy oil project proposed in Alberta	10-14	54
Syncrude sees no great harm from oil price dip	10-21	29
LNG storage unit planned in Ontario	10-21	38
Issue of Canadian gas prices growing hotter	10-21	40
Westmin steps up heavy oil development	10-21	44
Acreage demand up sharply in Alberta	10-21	46
Improving LPG recovery at West Pembina—G. R. Davet and N. C. Hircock	10-21	74
Loffland rigs draw contracts for operations in U.S., Canada	10-28	62
Spot sales of Alberta crude oil in U.S. deferred	10-28	65
Canada outlines exemptions from oil, gas revenue tax	11-4	59
Canada revamps federal frontier energy policy	11-4	65
Esso to speed Cold Lake heavy-oil work	11-4	65
Alberta to shut in 94,000 b/d of oil flow	11-4	67
Ottawa's move on gas prices, frontiers hailed	11-11	36
Buyers snapping up Canadian gas at reduced prices	11-11	36
Esso to consider refinery shutdown at Sarnia, Ontario	11-11	50
Joint venture kills Can-Am line project	11-25	34
Interprovincial sets more expansion of Canada-U.S. lines	11-25	38
Hike in Canadian gas exports to U.S. at issue	12-2	36
Imperial sees Beaufort-delta gas project	12-2	36
Petro-Canada: How it grew and where it likely is going	12-9	17
Petro-Canada assessing move toward privitization	12-9	19
Mobil gets Canadian Superior, sets outlay	12-16	51
TransCanada forms gas marketing unit	12-16	54
Operators cautiously continue Alberta play—John C. McCaslin	12-16	127
First half profits decline for Canadian industry	12-23	30
Controversy builds around refining in eastern Canada	12-30	59
CANADA (Offshore)		
Husky combine tests hydrocarbons on Grand Banks	1-14	44
Shell eyes gas production off eastern Canada	2-4	29
Canterra gauges oil on S. Hibernia block off Newfoundland	2-4	30
Panarctic plans limited Arctic drilling program	2-11	34
Two more strikes tested off Canada in Beaufort Sea	4-1	58
Mobil plugs test north of Sable Island; two wells planned	4-1	58
Firms prepare for production off east coast of Canada	4-8	35
Scotian Shelf well flows gas, condensate	4-29	49
Discovery results add to prospects of busy Scotian Shelf	5-13	81
Sohio, Gulf move toward Beaufort development	6-24	51
Mobil plugs troublesome Venture well	7-1	25
Mobil cuts estimate of Venture reserves	7-8	35
Canada panel: Stiffen offshore safety rules	7-29	74
More details revealed on Venture development	7-29	85
Petro-Canada tests oil off Newfoundland	8-5	32
Fixed concrete platform eyed for Hibernia field	8-12	49
Exploration pace quickens in Canadian Beaufort	8-19	51
Exclusion of Venture field reserves at issue	8-26	34
Rebound seen for drilling in 1986 off Nova Scotia	9-9	84
Government aid urged for work off Nova Scotia	9-23	50
Severe storm topples rig in Canadian Beaufort	9-30	22
Submersible barge to work with SSDC in Beaufort Sea	10-21	30
Drilling decline predicted off eastern Canada	10-21	49
Dome group gauges Beaufort oil strike	10-28	62
Husky-BV strike enhances outlook off eastern Canada	11-18	84
Petrocan plans more Terra Nova drilling	12-2	42
Grand Banks confirmation gauges flows	12-23	23
CARIBBEAN		
Saba Bank petroleum geology, NE Caribbean—Jean Marie Despretz, Thomas E. Daly, and Edward Robinson	11-4	112
CHILE		
Bank to assist several projects in Chile	1-28	83
CHINA		
ARCO due no equity role in China gas project	1-14	45
China offers more tracts; ACT group tests strike	2-4	36
Cogeneration due in Daqing oil field	2-11	53
China expects big growth in processing	2-18	57
BP plugs its ninth wildcat in Chinese waters	2-25	49
Communist countries show slight 1984 production gain	3-11	43
Chinese refinery set for construction	5-20	34
China buys five U.S. land rigs for Shengli field	5-27	38
World Bank lends more funds to Asian nations	6-10	64
U.S. pump units destined for China	6-10	69
Study assesses region to be opened to exploration in China	7-1	35
China opens bids on more offshore tracts	7-8	26
Argentina, China, Tanzania gas projects backed	7-8	30
China orders more U.S. seismic ware	8-5	35
China stems Huabei production decline	8-19	58
Chinese complete national geologic map	8-26	44
GE plant to power waterflood in China's giant Daqing oil field	9-9	84
China plans to boost gas production	9-9	84
China contracts Loffland Bros. for drilling services	9-23	55
China's 1990 oil output goal seen attainable	10-7	50
China to expand Nanjing complex	10-14	64
China areas termed good to excellent	10-14	66
U.S. instructs China on onshore contract terms	10-14	67
China aims to maintain Daqing flow	10-21	29
Combine plans to acquire onshore China block	11-25	41
Consultant cites problems in working in China	12-2	34
Chinese, U.S. crews drill deep giant flow	12-2	51
The Chinese onshore exploration agreements—Charlie Kirkwood	12-30	162
Chinese oil production through 1990—Charlie Kirkwood	12-30	167
CHINA (Offshore)		
China offers more tracts; ACT group tests strike	2-4	36
BP plugs its ninth wildcat in Chinese waters	2-25	49
More development planned off China	3-18	[illegible]
Phillips-Shell team gauges biggest oil flow in S. China Sea—W. Alan Petzet	4-22	48
China due more U.S. drilling imports	6-3	38
China opens bids on more offshore tracts	7-8	26
Statoil plans to drill on farmout in Yellow Sea	7-15	49
Field developments advance off China	8-26	44
Engineering pact set for field off China	9-16	62
S. China Sea confirmation logs oil flow	9-30	34
ARCO team to develop Yacheng field off China	10-7	51
ACT group gauges discovery off China	10-7	51
Two groups spud wildcats off South China	11-11	41
OFFSHORE CONSTRUCTION REPORT: Faulting, typhoons key to Weizhou 10-3 plans—Pierre Marty	11-11	86
China launches second round offshore awards	11-25	41
McDermott to install platforms off China	12-9	37
ACT group gets second area off China	12-30	54

	Date	Page
COLOMBIA		
Texaco unit acquires Colombian block	1-21	48
Jackson expands holdings in Llanos basin	1-28	82
Oxy takes block in Ecuador, scores again in NE Colombia	2-4	38
Giant Cano Limon discovery thrusts Colombia to forefront—Bob Williams	4-15	23
Petroleum geology of Colombia's Llanos basin: a summary—Chuck McCollough and Earl Padfield	4-15	82
Colombia's open door sparks E&D—Bob Williams	4-22	64
Another possible big oil strike lights up Colombian prospects	4-22	66
Oxy scores again in northern Llanos area	4-29	49
Royal Dutch/Shell to buy interest in Oxy's Llanos assets	6-10	75
Eurocan group plans search on four blocks in Colombia	9-30	22
Amoco schedules exploration on big Colombian block	10-28	43
Southland acquires block in Llanos basin	11-11	42
Big waterflood under way in Colombian field	11-18	70
CONGO		
Elf Sets development for field off Congo	10-21	50
CUBA		
Two Cuban holes west of Havana go below 18,000 ft	2-4	33
Cuba plans drilling, production increases	12-9	28
CURACAO		
Royal Dutch/Shell to close Curacao refinery	8-12	65
DENMARK		
Denmark's acreage offer draws bidders	11-25	30
DUBAI		
Guide to export crudes for the '80s—Two high-quality offshore crude oils, Sharjah Condensate and Margham Light, are assayed—Richard A. Corbett	7-8	54
ECUADOR		
Oxy takes block in Ecuador, scores again in NE Colombia	2-4	38
Ecuador expects increased onshore exploration	2-18	50
Texaco-Pecten to explore Ecuador block	11-11	34
Occidental tests oil discovery in Ecuador	11-18	74
Exploration to pick up next year in Ecuador	11-25	43
EGYPT		
Texas International tests Western Desert strike	2-11	42
SUCO steps up crude oil output in Gulf of Suez	4-8	46
Esso to tap East Zeit oil field off Egypt	6-24	57
Conoco joins search in Western Desert	9-23	65
Ethylene terminal planned off Egypt	10-7	62
Gulf of Suez field due on production	10-7	62
EUROPE (General)		
Energy consumption outlook for selected countries	1-7	66
DRI sees peak near for Europe's oil, gas output	1-7	67
Europe's chill eases price pressures on OPEC—Roger Vielvoye	1-21	49
Major study reveals EEC gas oil desulfurization costs—G. J. Waller, M. C. Conrard, G. Cremer, J. W. J. Koenig, H. M. Opitz, J. P. Queme, P. Sibra, R. Th. Sobel, and J. M. L. M. Vlemmings	1-21	55
E&D hits fast pace off NW Europe	2-11	32
Future gloomy for refining industry in western Europe—Roger Vielvoye	3-18	41
Soviet Union seen dominating European energy market	5-13	74
European energy market share fight seen through 2000	6-17	58
More European refinery shutdowns seen	7-22	50
Comment: Gas role in Europe tied to competitive pricing—Helga Steeg	10-7	46
Refinery projects pushed in Europe, Africa, Asia	11-18	61
European systems check integrity of marine installations	12-30	42
FRANCE		
Improved economics prompt another look at France's Paris basin—Herbert L. Brewer	1-7	105
Triton plans to concentrate on Paris basin E&D	3-4	46
Oil production building in Paris basin—Marcia A. Parker	6-17	80
Chaunoy field to be linked with Le Havre	9-23	46
Refinery cuts planned in France, Spain	12-9	36
GABON		
Tenneco group scores third find off Gabon	9-30	23
GUATEMALA		
Hispanoil operates Guatemala block under altered law	4-8	58
Exploration pace due to pick up in N. Guatemala	8-26	40
GUINEA-BISSAU		
The petroleum geology of the Republic of Guinea-Bissau—Michael A. Dumestre and Francisco F. Carvalho	3-4	260
GULF OF GUINEA		
OFFSHORE REPORT: Northern Gulf of Guinea shows promise—M. A. Dumestre	5-6	154
GUYANA		
Petroleum potential of Offshore Guyana—Steve Lawrence and Peter Coster	12-9	67
INDIA		
India orders seven H_2S oxidation units	1-7	53
Last foreign firms, Chevron, partners, quit search in India	3-11	66
ONGC to place two more offshore rigs in operation	4-15	30
India plans Hazira gas treatment plant	5-13	83
Less developed countries push campaigns to tap natural gas—Marcia A. Parker	6-10	57
India, Soviet Union sign exploration pact	6-24	51
Contractors vie to lay Indian gas pipeline	9-9	84
Oil, gas spending cut recommended for India	9-23	57
Pipeline project to boost gas use in India	10-21	38
India schedules to increase outlays in petroleum projects	12-30	52
INDONESIA		
Field off Indonesia to be developed	2-25	48
Indonesia's plant gate natural gas price at issue	3-11	57
Union renews and enlarges contract area in E. Kalimantan	3-18	52
Indonesian field eyed for development	4-22	49
Less developed countries push campaigns to tap natural gas—Marcia A. Parker	6-10	57
Rise, decline seen for Indonesian oil	7-1	35
Change seen key to Indonesian oil outlook—Stephen Tanzi	7-29	162
INTERNATIONAL, General		
Less developed countries push campaigns to tap natural gas—Marcia A. Parker	6-10	57
IRAN		
Iran revives plans for crude oil pipeline	4-29	64
Tanker casualty list lengthens in Iran-Iraq war	6-17	68
Air strike heavily damages Kharg Island terminal	9-30	23
Iran's oil exports seen cut sharply for several months	10-14	61
IRAQ		
Iraq-Turkey oil pipeline accord near	2-25	55
Tanker casualty list lengthens in Iran-Iraq war	6-17	68
IRELAND		
Ireland to encourage offshore development	5-6	97
Ireland makes 15 offshore block awards	11-4	62
IRISH SEA		
Morecambe field in Irish Sea starts first phase production	1-21	44
ISRAEL		
Israeli-U.S. group near choice of wildcat site in Negev Desert	9-2	22
ITALY		
Agip developing five gas fields in Italy	1-28	78
Italy's Vega field to start production in '87	5-13	73
Elf group plans development of heavy oil field in Adriatic	6-17	72
JAMAICA		
Jamaican oil work due Canadian aid	5-27	36
JAPAN		
Talks extended on Canadian LNG project	1-7	70
Canadian LNG project loses one customer	2-11	30
Tomakomai hydrocracker on stream	2-11	45
Japanese utilities agree to import LNG from Thailand	7-8	29
Kellogg, Idemitsu plant boosts olefins process	7-15	60
Japan pushes overseas E&D programs	8-19	48
Japan urged to lift import bans, trim refining	10-7	54
Japanese bill would lift product imports bar	10-21	43
Japex, Pertamina to explore Sumatra tract	12-16	69
KUWAIT		
Kuwait Petroleum moving to market unleaded gasoline	1-14	53
Comment: KPC: No threat from OPEC downstream move—Nader H. Sultan	7-15	57
LIBYA		
KCA takes on more international drilling work	1-14	47
MALAYSIA		
History and geology of Malaysia's Tinggi field—J. B. Bram, Mohd Yusof Mohiuddin, and S. L. Reid	2-18	127
Less developed countries push campaigns to tap natural gas—Marcia A. Parker	6-10	57
Malay, Thai accord near on S. China Sea	7-1	28
Industry awaits incentives, acreage in Malaysia—Marcia A. Parker	7-22	48
Petronas cleared to resume exploration	8-26	32
Petronas may revive refinery project	9-2	22

	Date	Page
Malaysia: Shell mull gas to products project	9-16	62
First Guntong oil field platform on stream	12-9	37
Malaysia revises terms of offshore contracts	12-30	49
MEXICO		
Pemex projects more drilling in 1985-89 plan	1-28	83
Mexican hydrocarbon reserves decline in 1984	4-1	48
Pemex schedules offshore waterflood	6-17	66
MEXICO, Offshore		
Pemex schedules offshore waterflood	6-17	66
MOROCCO		
Seismic option acquired off Morocco	8-19	51
NETHERLANDS		
Dutch gas exports to West Germany extended	1-14	47
Dutch processing plants due revamp	3-18	44
Dutch government awards 24 blocks in North Sea	3-18	52
OFFSHORE NORTHERN EUROPE REPORT: Dutch offshore crude and gas production post increases—Roger Vielvoye	6-10	116
Royal Dutch/Shell to close Curacao refinery	8-12	65
Amoco starts Rijn production off Holland	12-30	42
NETHERLANDS ANTILLES		
Royal Dutch/Shell to close Curacao refinery	8-12	65
Shell sells Curacao refinery to government	10-14	69
NEW ZEALAND		
Amoco to explore block on New Zealand's South Island	8-12	49
New Zealand gas to gasoline plant near start-up	8-26	38
New Zealand synthetic fuels plant starts up	10-28	52
NEW ZEALAND (Offshore)		
Exploration program set off New Zealand	1-7	67
NIGERIA		
DRILLING TECHNOLOGY REPORT: Study identifies Niger Delta rig parameter, VSP trends—Mark J. Ichara and Akpo A. Avbovbo	3-4	94
How to handle abnormal pressures in Nigeria's Niger Delta area—Mark J. Ichara and Akpo A. Avbovbo	3-11	122
Nigerian refineries strive for product balance—P. A. Obuasi	6-17	110
NORTH SEA		
Marathon orders Brae modules, tests appraisal	1-14	57
Amoco top bidder in U.K. ninth round	2-4	38
E&D hits fast pace off NW Europe	2-11	32
Shell-Esso marks low pressure Tern field for development	2-18	68
U.K. nixes Sleipner imports; Gullfaks work set	2-18	68
Joint venture plans to build N. Sea production semi	2-18	69
Norwegian firm claims first in 3D seismic survey	2-25	50
Shell-Esso to set more platforms in N. Sea field	2-25	55
Texaco hails Highlander technology	3-11	48
Dutch government awards 24 blocks in North Sea	3-18	52
Hydrocarbon generation—central and northern North Sea—M. L. Reeder and I. C. Scotchman	3-25	137
Platform designed for Norwegian Trench	4-8	54
Elf's Skuld subsea production unit finishes tests	4-8	55
Hamilton claims world record lift in U.K. North Sea	4-22	49
Shell-Esso may tap small North Sea oil fields	5-20	35
Two more strikes tested in North Sea	5-27	44
U.K. awards licenses on 80 offshore blocks	6-3	33
OFFSHORE NORTHERN EUROPE REPORT: Oil development boom heats up off U.K.—Roger Vielvoye	6-10	92
OFFSHORE NORTHERN EUROPE REPORT: Development cost control vital in marginal projects off U.K.—Roger Vielvoye	6-10	128
Britoil plans to explore North Sea block	7-1	28
More field development shaping up in N. Sea	7-8	35
Third platform starts production in Statfjord field	7-15	51
Pioneering system ready for North Sea field	7-29	70
Membrane-based nitrogen generator moves offshore	7-29	136
Mobil to order evacuation system for Statfjord	8-5	48
Tommeliten gas eyed to halt Ekofisk subsidence	8-5	49
Independents playing bigger role in U.K. N. Sea search—Roger Vielvoye	8-12	41
Britoil aims to step up production from foreign holdings	8-12	43
BP tests North Sea oil, gas discovery	8-12	44
Three gathering networks comprise northern North Sea gas system—George W. Crayston and P. A. Philpot	8-12	84
Mobil unit rejects offer of two blocks in Norwegian North Sea	9-9	69
Ekofisk gas injection hiked to stem subsidence	9-9	69
BGC starts gas injection in N. Sea's Rough field	9-16	65
Flow of development projects slows off U.K.—Roger Vielvoye	9-16	65
Floating production units compete for N. Sea operations	9-23	48
More development slated in N. Sea	9-23	49
Discoveries tested in Norwegian, North seas	9-23	50
Subsea flowlines—1: J-tube pull-in theory is applied to North Sea's Troll multiple flowing bundles—G. J. Maten and M. Hales	9-23	138
Subsea flowlines—conclusion: Full-scale pull-in loads for multiple flowline bundles in North Sea's Troll field predicted—G. J. Maten and M. Hales	9-30	42
Troll gas sales pact under negotiation	10-7	46
Shell: Sliding oil price unlikely to trim U.K. North Sea output	10-7	65
Texaco to tap small Petronella field in N. Sea	10-14	46
Troll well flows record gas volume for N. Sea	10-21	40
Pipelay vessel, other units due in North Sea	10-21	48
Buchan due pipeline outlet; Statpipe starts up	10-21	48
Development approved for Eider field	11-4	62
N. Sea oil production headed for 3.7 million b/d high mark—Roger Vielvoye	11-11	25
Elf agrees to buy 'T' block interest	11-11	27
OFFSHORE CONSTRUCTION REPORT: Uptick due for U.K. North Sea pipelines—Warren R. True	11-11	55
OFFSHORE CONSTRUCTION REPORT: Highlander gets first subsea slug catcher for marginal-field development	11-11	58
Another platform on production in Leman gas field	11-18	71
Arctic class semi preparing to work in N. Sea	12-2	42
Ekofisk subsidence costs could rise	12-9	26
U.K. North Sea yields more oil, gas discoveries	12-16	52
Orders placed for development of North Sea fields	12-23	27
Strain gauge installed on Fulmar storage unit	12-30	43
NORTHERN EUROPE (Offshore)		
E&D hits fast pace off NW Europe	2-11	32
Discoveries spark industry interest in Norwegian Sea—Roger Vielvoye	3-4	41
OFFSHORE NORTHERN EUROPE REPORT: Oil production up, activity levels high off northern Europe—Roger Vielvoye	6-10	91
OFFSHORE NORTHERN EUROPE REPORT: Oil development boom heats up off U.K.—Roger Vielvoye	6-10	92
OFFSHORE NORTHERN EUROPE REPORT: U.K. focus on domestic natural gas promises more brisk offshore activity—Roger Vielvoye	6-10	96
OFFSHORE NORTHERN EUROPE REPORT: Norway eyes replacements for Sleipner gas project—Roger Vielvoye	6-10	104
OFFSHORE NORTHERN EUROPE REPORT: Dutch offshore crude and gas production post increases—Roger Vielvoye	6-10	116
OFFSHORE NORTHERN EUROPE REPORT: Technology, terms keys to small producer work—Roger Vielvoye	6-10	122
OFFSHORE NORTHERN EUROPE REPORT: Development cost control vital in marginal projects off U.K.—Roger Vielvoye	6-10	128
Declining demand seen for rigs off Northwest Europe	11-11	28
NORWAY		
Norway moving to award 13 blocks in ninth round	1-21	38
Norway discloses assignments in ninth round of licensing	1-28	78
Spitsbergen area exploration programs pick up—Roger Vielvoye	2-4	40
E&D hits fast pace off NW Europe	2-11	32
U.K. nixes Sleipner imports; Gullfaks work set	2-18	68
Norwegian firm claims first in 3D seismic survey	2-25	50
Discoveries spark industry interest in Norwegian Sea—Roger Vielvoye	3-4	41
Norway to probe offshore frontiers	3-11	44
Platform designed for Norwegian Trench	4-8	54
Exxon plans to sell its Swedish downstream units	4-8	54
Elf's Skuld subsea production unit finishes tests	4-8	55
Another strike shaping up in Norwegian Sea	4-15	35
Tromsoflaket well flows oil at good rates	5-13	76
Statoil aims for integrated, international scope	6-3	32
OFFSHORE NORTHERN EUROPE REPORT: Norway eyes replacements for Sleipner gas project—Roger Vielvoye	6-10	104
Conoco group gauges Haltenbanken discovery	6-17	64
Statoil plans to drill on farmout in Yellow Sea	7-15	49
Third platform starts production in Statfjord field	7-15	51
Statoil group gauges Haltenbanken strike	7-22	46
Mobil to order evacuation system for Statfjord	8-5	48
Tommeliten gas eyed to halt Ekofisk subsidence	8-5	49
Mobil unit rejects offer of two blocks in Norwegian North Sea	9-9	69
Discoveries tested in Norwegian, North seas	9-23	50
Conoco eyes TLP for Norwegian Sea project	9-30	35
Blowout hits test in Norwegian Sea	10-14	46
Norsk firm seeks stake in Lysekil refinery	11-11	33
Changes urged in Norway's tax, fiscal policies	12-16	66
Cathodic protection, coatings protect Statpipe system—S. Lund, H. T. Aaten, R. T. Page, and K. A. Binns	12-23	47
Norway may veto early start-up of Gullfaks C	12-30	41
Tests set for subsea production system	12-30	41
OMAN		
Three firms acquire Omani concession in Persian Gulf	3-18	59
PADANG ISLAND		
BP seeks field development on Padang island	4-8	56
Indonesian field eyed for development	4-22	49
PAKISTAN		
KCA takes on more international drilling work	1-4	47
Union Texas has another discovery in SE Pakistan	2-11	39

	Date	Page
Oxy gauges big confirmation well in Pakistan	2-18	61
Pakistan seeks to spur exploration	3-4	49
Less devel[illegible] countries push campaigns to tap natural gas—Marcia A. Parker	6-10	57
[illegible] strike in Pakistan	6-10	60
[illegible] more funds to Asian nations	6-10	64
[illegible] E&D projects	7-1	36
[illegible] Pakistan strike	7-1	36
Union [illegible] more oil in Pakistan	7-22	49
Round of exploration expected in Pakistan	10-28	43
Pakistan to boost Mari gas output	11-25	36
International funds aid Pakistan's Mari gas project	12-23	25
PAPUA NEW GUINEA		
Petroleum potential of the Papuan basin—W. D. Stewart and E. F. Durkee	4-1	151
PARAGUAY		
Exploration program planned on large block in East Paraguay	10-14	64
PERU		
Operators in Peru trim 1985 E&D drilling programs	2-18	50
Decline in export revenue predicted for Peru	3-18	59
Gas development off Peru under discussion	4-22	53
Petroperu negotiating exploration pacts	5-20	38
New government in Peru plans to revamp incentives	8-26	39
Peru rescinds contracts with Oxy, Belco	9-9	70
Operators in Peru anxious for new contracts	10-21	33
Peru begins talks on new operating contracts	11-4	60
POLAND		
Baltic Sea strike due detailed study	11-18	77
ROMANIA		
Production [illegible] in Romanian region	2-4	33
Romania to tap its first field in Black Sea	8-5	48
SAUDI ARABIA		
Saudi petchem output tops design volume	1-21	32
ANNUAL PE[illegible]HEMICAL ISSUE: Saudi petrochem complexes make debut—Ted Wett	3-25	71
Arabian crude-oil residues evaluated—Mohammad Farhat Ali, Misbah Hasan, Ahmed Bukhari, and Mohammad Saleem	8-12	71
Al-Jubail refinery starts full operations	8-19	59
Saudis' refiner netback contracts push OPEC to brink of price war—Roger Vielvoye	9-23	41
Saudi crude production hike could trim prices further	11-18	84
Financing set for Saudi polyethylene plant	11-25	50
SCOTLAND		
Mossmorran ethylene cracker near start-up	7-29	66
Upgrade advances at Scottish refinery	7-29	68
ANNUAL GEOPHYSICAL REPORT: Petroleum prospects in the northwest seaboard of Scotland—Tom Kilenyi and Bob Standley	10-7	100
SENEGAL		
The petroleum geology of Senegal—Michael A. Dumestre	10-28	146
SHARJAH		
Guide to export crudes for the '80s—Two high quality offshore crude oils, Sharjah Condensate and Margham Light, are assayed—Richard A. Corbett	7-8	54
SICILY		
Texaco group acquires block off Sicily	2-18	61
SINGAPORE		
Big Singapore refining center faces sharp drop in crude runs—Roger Vielvoye and Michael Obel	11-18	57
Hydrocracker project on schedule at Singapore refinery	11-18	60
SOUTHEAST ASIA		
BP investing for power base in Southeast Asia—Roger Vielvoye	11-4	52
SPAIN		
Eniepsa gets loan for Gaviota project	1-14	36
KCA takes on more international drilling work	1-14	47
INH targets exploration development in Spain	4-8	56
Hispanoil operates Guatemala block under altered law	4-8	58
Revamp of big Spanish refinery complete	9-9	72
Spain to merge units, maintain spending	10-28	44
Spain to expand gas distribution system	11-18	79
Plan for Spanish terminals advances	11-25	38
Refinery cuts planned in France, Spain	12-9	36
Spain's state oil firms merge, push oil, gas work—Roger Vielvoye	12-16	58
SRI LANKA		
Sri Lanka needs more exploration—Roger R. [illegible]	1-28	169

	Date	Page
SUMATRA		
BP seeks field development on Padang island	4-8	56
Asamera schedules delineation drilling in Sumatra oil field	7-8	34
Japex, Pertamina to explore Sumatra tract	12-16	69
SURINAME		
Exploration scheduled off Suriname	10-21	43
SWEDEN		
All-terrain crawler will be adapted for deepwater use	3-18	53
Oresund submarine pipeline—Sweden's access to North Sea Gas—Max Eliasson, Jan Molin, and Jan Erik Janson	10-7	120
Norsk firm seeks stake in Lysekil refinery	11-11	33
TANZANIA		
Argentina, China, Tanzania gas projects backed	7-8	30
TASMANIA		
Survey heightens prospects off Tasmania—John C. McCaslin	12-23	63
THAILAND		
Groups to bid on refinery expansion work in Thailand	1-28	73
Exploration programs slated on new blocks in Thailand	3-4	49
Exploration to pace activity hike in Thailand	3-18	48
Union places third gas field on stream in Gulf of Thailand	3-18	50
Union to meet Thailand's gas demand	4-1	51
Thailand seeking bids on onshore, offshore acreage	4-8	51
Thai Shell in accord for Sirikit area development	5-13	75
Less developed countries push campaigns to tap natural gas—Marcia A. Parker	6-10	57
World Bank lends more funds to Asian nations	6-10	64
Malay, Thai accord near on S. China Sea	7-1	28
Japanese utilities agree to import LNG from Thailand	7-8	29
Thailand advances plan for fertilizer plant	7-15	66
Thai Shell's new exploration target: offshore oil	7-29	75
Union trims gas program off Thailand	8-26	37
Thailand's gas production shows big advance	9-2	35
Contractors vie to construct Thai petrochem complex	10-14	64
Thai Shell signs oil price, development pacts	10-28	67
Firms shortlisted for olefins project in Thailand	11-25	42
Thailand to assess supply for $9 billion LNG project	11-25	51
Government, companies boost Thai oil activity	12-16	68
TUNISIA		
Eocene and Upper Cretaceous carbonate reservoirs in East Central Tunisia—W. F. Bishop	12-2	137
TURKEY		
KCA takes on more international drilling work	1-14	47
Iraq-Turkey oil pipeline accord near	2-25	55
Esso acquires two blocks in Turkey	3-18	51
UGANDA		
Uganda gets IDA credit for oil and gas work	4-1	52
UNITED ARAB EMIRATES		
Field off U.A.E. to get permanent production facility	3-11	54
Guide to export crudes for the '80s—Two high-quality offshore crude oils, Sharjah Condensate and Margham Light, are assayed—Richard A. Corbett	7-8	54
Gulf to complete fifth well in Saleh field	11-25	48
UNITED KINGDOM		
Morecambe field in Irish Sea starts first phase production	1-21	44
Amoco top bidder in U.K. ninth round	2-4	38
Scottish agency predicts big gains in offshore outlay	2-18	56
U.K. nixes Sleipner imports; Gullfaks work set	2-18	68
U.K. won't revamp offshore production taxes	4-1	51
BP to shut down second U.K. refinery	4-15	28
Esso to study Atlantic deepwater production	4-15	40
Hamilton claims world record lift in U.K. North Sea	4-22	49
Four appraisal wells set for Wytch Farm	5-13	75
BGC, Britoil moving toward private ownership	5-13	84
Exploratory appraisal drilling pace hits fast clip off U.K.	5-20	35
U.K. awards licenses on 80 offshore blocks	6-3	33
U.K. agency plans pilot coal liquefaction plant	6-3	42
OFFSHORE NORTHERN EUROPE REPORT: Oil development boom heats up off U.K.—Roger Vielvoye	6-10	92
OFFSHORE NORTHERN EUROPE REPORT: U.K. focus on domestic natural gas promises more brisk offshore activity—Roger Vielvoye	6-10	96
OFFSHORE NORTHERN EUROPE REPORT: Development cost control vital in marginal projects off U.K.—Roger Vielvoye	6-10	128
How a British company's subsidiary operates in the U.S.	7-22	44
Mossmorran ethylene cracker near start-up	7-29	66
Upgrade advances at Scottish refinery	7-29	68
Independents playing bigger role in U.K. N. Sea search—Roger Vielvoye	8-12	41
Britoil aims to step up production from foreign holdings	8-12	43

	Date	Page
British Gas has seamless pipe inspection program—Lawrence Jackson, Ernest Shannon, and G. A. Adey	9-9	147
Four groups slate exploration on Morecambe Bay acreage	10-7	56
Operators seek onshore U.K. acreage	10-7	62
BP investing for power base in Southeast Asia—Roger Vielvoye	11-4	52
OFFSHORE CONSTRUCTION REPORT: Uptick due for U.K. North Sea pipelines—Warren R. True	11-11	55
OFFSHORE CONSTRUCTION REPORT: Highlander gets first subsea slug catcher for marginal-field development	11-11	58
Amerada Hess to buy Monsanto U.K.	11-18	70
Esso completes turnaround of cat cracker at Fawley	12-2	40
U.K. North Sea yields more oil, gas discoveries	12-16	52
Shell U.K. to replace cracker at Stanlow	12-23	20
BGC hold on U.K. gas sales broken	12-30	48
U.S.S.R.		
Soviets plan 500 wells in Yamburg gas field	1-14	31
Soviets start up coal liquefaction plant in Tula region	1-14	34
Soviet gas industry to surpass most 1985 targets	1-28	64
Soviet christen first of two Arctic class jack up rigs	2-4	41
Soviet 1984 oil production shows unusual dip	2-18	64
Soviets get second Caspian crane vessel	2-18	65
Soviets add to rigs in Caspian	2-25	56
Communist countries show slight 1984 production gain	3-11	43
Soviets' Chimkent refinery starts up	3-11	44
Soviets try to bolster W. Siberian oil production	3-18	60
Soviets finish sixth big gas line from W. Siberia	3-18	66
U.S.S.R. plans major gas pipeline extension	4-1	46
U.S.S.R. to expand fleet of Arctic class rigs	4-15	40
Soviet Union plans to assess Arctic discovery drilled in 1948	4-22	66
Soviet drilling program shy of target	4-29	60
Soviet Union seen dominating European energy market	5-13	74
Soviet energy exports in 1984 hit record level	5-13	74
Soviet Union building third superheavy rig	5-20	50
U.S.S.R. starts up another big line	5-27	40
Soviets to step up exploration campaign	5-27	44
Big U.S.S.R. oil output jump doubted	6-24	44
India, Soviet Union sign exploration pact	6-24	51
Increases in Soviets' revenue from oil exports tapering off	7-8	23
Soviet spending accents natural gas pipelines	7-15	62
Soviets press Chukotsk Peninsula search	7-22	46
Soviets try to speed superdeep test drilling	7-29	65
Problems plague big Soviet oil field	8-12	66
U.S.S.R. completes gas lift program in Federovskoye field	8-12	67
Soviet Union scores again in Caspian	8-12	67
Soviets sending crane vessel to Caspian	8-24	43
Soviet Union plans coal slurry system	9-2	25
Soviet Union's slump trims Communist oil production	9-9	61
Soviets to build jack ups at Vyborg	9-16	78
Gorbachev cites W. Siberia's woes	10-7	66
Soviet crane ship slated to construct platforms in Baltic	10-21	34
Soviets search for deep gas in Turkmenia desert	10-21	38
Shale oil helps fuel Soviet power plant	10-28	44
Soviets check first-half flow slide	11-4	54
CIA jumps estimate of Soviet oil exports	11-4	54
Soviet Union starts shipping Arctic crude oil	11-4	59
Soviets complete Astrakhan pipelines	11-18	79
Another Soviet Arctic jack up christened	11-25	36
Yamal Peninsula yields first crude	11-25	43
Soviets map ambitious energy plan	12-2	48
U.S.S.R. schedules more superdeep drilling	12-9	32
Soviet Union seeks oil production turnaround during 1986	12-9	33
Soviet's Baltic Sea scheduled for first ice resistant platform	12-23	23
VENEZUELA		
Exploration in Venezuela yields light oil discoveries	1-14	42
Corpoven to boost output west of Maracaibo	2-11	48
Petroven feels more fiscal pressure	3-4	58
Venezuela to U.S.: Don't impose oil import fee	9-23	66
Meneven gas utilization project near full service	11-11	35
Corpoven hails new oil area near Cano Limon—Marcia A. Parker	11-18	76
Venezuela tries to broaden international scope	12-2	33
VIET NAM		
Viet Nam developing S. China Sea field	4-15	44
WEST AFRICA		
OFFSHORE REPORT: Northern Gulf of Guinea shows promise—M. A. Dumestre	5-6	154
WEST GERMANY		
Dutch gas exports to West Germany extended	1-14	47
BP to close two West German refineries	2-11	28
Fiftieth CCR reformer goes on stream in Germany	3-18	144
Texaco tests two W. German gas strikes	4-22	53
Plan eyed to keep Mobil refinery open	5-13	76
Mobil agrees to sell W. German refinery	12-30	38

	Date	Page
YEMEN		
Exxon acquires interest in Yemen block	12-30	58
YUGOSLAVIA		
World Bank to assist Yugoslav gas projects	7-22	58

STATES

	Date	Page
ALABAMA		
South Alabama wells open Cretaceous zones	2-4	32
Leasing, drilling in state and federal Alabama waters	4-22	134
Gas cycling to boost Hatter's Pond recovery—G. Alan Petzet	4-29	56
Alabama well taps thick Smackover pay	9-30	28
Alabama earmarks Mobile Bay tracts for lease	10-14	57
Black Warrior basin yields deep gas find—John C. McCaslin	10-21	119
ALABAMA (Offshore)		
Mobile Bay shaping up as major gas producing area—Rick Hagar	1-14	25
Mobile Bay yields another significant deep gas discovery	2-11	46
Exxon to step up Mobile Bay search—Rick Hagar	2-18	66
Leasing, drilling in state and federal Alabama waters	4-22	134
Exxon chalks up another Norphlet discovery off Alabama	5-6	86
Mobile Bay deep gas province due U.S. interstate system link	5-20	41
Deep water, Mobile Bay tracts spark Sale 98—Rick Hagar	5-27	46
Exxon and Chevron score in Mobile Bay—John C. McCaslin	6-17	143
Exxon reenters, tests gas at Mobile strike	6-24	42
Interior marks eastern gulf leases to be offered	8-26	32
Flexure, Mobile Bay trends continue to sizzle	9-9	83
Alabama earmarks Mobile Bay tracts for lease	10-14	57
ALASKA		
ARCO Pipe Line agrees to reduce TAPS tariff	1-7	57
Milne Point production modules taking shape	1-14	36
TAPS to replace segment hit by subsidence	1-28	66
Alaskan LNG exports to Orient due study	2-4	43
ARCO drilling industry's first wildcat on NPR-A	2-11	52
Chevron to drill first wildcat on Alaskan refuge	2-18	52
Conoco completes Milne Point field operations facility	4-1	48
ANNUAL PRODUCTION ISSUE: Prudhoe challenges new choke-valve design—Dan L. Snyder	4-1	97
BP proposes reduction in trans-Alaska line tariff	5-6	84
Proposed TAPS tariff settlement draws protest	6-24	50
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: Milne Point Unit—small but welcome	6-24	55
Value of Cook Inlet/Kenai area gas disputed	7-1	28
North Slope sealift near Alaskan destination	8-5	34
NORTH AMERICAN ARCTIC REPORT: ARCO eyes production start at Lisburne during late 1986—Bob Williams	8-5	84
Alaska sets North Slope lease sales, eyes more	8-19	52
LNG shipments to Orient seen best outlet for North Slope gas	9-9	76
Cook Inlet crude oil exports approved	11-4	67
Alaska seeks delay for North Aleutian basin sale	11-11	41
Conoco places Milne Point field on production	11-25	32
Milne Point long term future tied to royalty cut	12-2	43
Alaskan pipeline agrees to settlement of royalty dispute	12-30	58
ALASKA (Offshore)		
Exxon abandons costly dry hole in Beaufort Sea	1-28	74
MMS selects sale tracts in Alaska's Bristol Bay	2-4	32
U.S. Arctic waters due first development	2-11	36
Lease sale area outlined in Norton basin off Alaska	3-25	64
First wildcats scheduled in Navarin basin off Alaska	5-6	73
Sohio, Gulf move toward Beaufort development	6-24	57
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: First Arctic offshore field, Endicott, on decade-long way to production—M. I. Curtis and D. B. Huxley	6-24	64
NORTH AMERICAN ARCTIC REPORT: Economics critical to Arctic developments—Bob Williams	8-5	55
NORTH AMERICAN ARCTIC REPORT: Engineers trying new approach to Arctic construction, production, and transportation—Bob Williams	8-5	76
NORTH AMERICAN ARCTIC REPORT: Alaskan exploration shifts to eastern Beaufort—Bob Williams	8-5	80
Spray ice island technology advancing in Arctic—Bob Williams	9-2	28
Interior tentatively schedules 1986 lease sale in Bristol Bay	9-16	70
Drilling halted in two Bering Sea areas	11-4	65
Interior to proceed with North Aleutian sale	12-23	30
ANADARKO BASIN		
EXPLORATION/DEVELOPMENT USA: Midcontinent action tips toward development—G. Alan Petzet	3-11	94
Declining natural gas prices take toll of operations in Anadarko basin—G. Alan Petzet	10-21	25

APPALACHIAN BASIN

	Date	Page
USGS study pinpoints Appalachian traps	2-25	68
Ordovician stratigraphic hydrocarbon entrapment potential of Appalachia—Gerald J. Henderson and Carolyn M. Timm	4-29	118
An overview of hydrocarbon production in Appalachian basin—a glance at the forest—Patrick J. Burns and Robert C. Claus	8-12	116
Slim hole drilling cuts deepending cost in Appalachian area	8-19	50

ARCTIC

	Date	Page
U.S. Arctic waters due first development	2-11	36
Electro-optic monitoring studies for Arctic lines	5-6	83
OTA cites need for Arctic, deepwater drilling initiatives	5-13	58
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: Milne Point Unit—small but welcome	6-24	55
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: Odeco designs massive deepwater Arctic rig—Luc Chabot	6-24	59
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: First Arctic offshore field, Endicott, on decade-long way to production—M. I. Curtis and D. B. Huxley	6-24	64
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: Bechtel studies subsea freezing behavior	6-24	72
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: Operating tips boost arctic diesel efficiency—William J. Gardner	6-24	73
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: Computer program uses simulation method to help manage weather-sensitive projects—Henry Chen	6-24	80
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: Arctic waterflood pipelines in Prudhoe Bay injection project require protection analysis—Charles L. Arnold	6-24	89
New elastomer developed specifically for arctic wellheads—Kelly Copley	7-1	60
Wind-induced fatigue damage estimated for surface oil pipelines in the Arctic—D. G. Honegger, D. J. Nyman, and K. J. Nyman	7-8	49
NORTH AMERICAN ARCTIC REPORT: Economics critical to Arctic developments—Bob Williams	8-5	55
NORTH AMERICAN ARCTIC REPORT: Engineers trying new approach to Arctic construction, production, and transportation—Bob Williams	8-5	76
NORTH AMERICAN ARCTIC REPORT: Alaskan exploration shifts to eastern Beaufort	8-5	80
NORTH AMERICAN ARCTIC REPORT: ARCO eyes production start at Lisburne during late 1986—Bob Williams	8-5	84
Spray ice island technology advancing in Arctic—Bob Williams	9-2	28

ARIZONA

	Date	Page
Kaiparowits basin: an old frontier with new potential—Thomas R. Lyons and Scott Montgomery	1-7	112

ARKANSAS

	Date	Page
Arkansas natural gas line planned	2-18	65
New era seen possible for Ark-La-Tex area—John C. McCaslin	2-25	121
EXPLORATION/DEVELOPMENT USA: Midcontinent action tips toward development—G. Alan Petzet	3-11	94
Planned Arkansas gas line switches route	7-15	67
Second intrastate gas system slated in eastern Arkoma basin	10-28	46

BLACK WARRIOR BASIN

	Date	Page
Black Warrior basin yields deep gas field—John C. McCaslin	10-21	119

CALIFORNIA

	Date	Page
California EOR, cogeneration sales are gas line targets	2-11	29
Another trans-California gas pipeline proposed	3-25	48
California cogeneration on the rise—Bob Williams	3-25	56
N. California dry gas fields brighten 1984 hunt—Ron Lemke	4-15	88
Third gas pipeline proposed to California area	5-6	84
California gas pipeline proposals advancing	6-10	68
California study endorses methanol	6-17	70
Binary geothermal plant prepares for start-up—Bob Williams	6-24	33
Cool Water calls first year 'highly successful'	7-1	37
Two California pipeline projects may team up	8-12	50
Miocene yields big oil flow in California	8-12	67
Confirmation slated for Kern discovery	8-19	51
Struggle develops over potential EOR gas market in California—Bob Williams	8-26	25
California utilities make major spot market gas purchases	8-26	28
Big Kern County cogeneration plant starts up—Bob Williams	10-14	55
Salton Sea geothermal test spudded	10-28	46
Group plans to restart California refinery	10-28	52
Heber dual flash geothermal project starts up	11-11	49
Cool Water plant hits 80% of capacity	11-18	69
Reformer explodes at ARCO's Watson refinery	12-16	68
Oxy to press battle to drill in Los Angeles area	12-30	49

CALIFORNIA (Offshore)

	Date	Page
MMS may tighten air quality rules off California	1-14	52
OFFSHORE SOUTHERN CALIFORNIA REPORT: Big finds spur push off California—Bob Williams	1-14	55
OFFSHORE SOUTHERN CALIFORNIA REPORT: Access problems cloud exploration off California—Bob Williams	1-14	60
OFFSHORE SOUTHERN CALIFORNIA REPORT: Miocene Monterey remains major challenge—Bob Williams	1-14	70
Union confirms find in marine sanctuary off California	2-18	50
Santa Maria basin oil field extended	3-18	50
ARCO to revamp Offshore California field development	4-29	46
Santa Maria basin field projects advancing	6-3	46
California OCS deal would cut leasing	7-22	62
Tracts in California pact far from choice	7-29	78
Herrington: Don't padlock big batch of tracts off California	8-19	58
Two oil development projects advance off southern California	8-19	62
Hodel may revamp tract lockup off California	9-2	23
Hodel's California OCS deal fumbles—Patrick Crow	9-16	68
Another strike turns up in Santa Maria basin	9-23	52
Hodel seeks to end dispute on California OCS emissions	11-18	72
Talks on California OCS leasing ban at issue	11-18	72

COLORADO

	Date	Page
Facies relationships, reservoir potential of Ohio Creek interval across the Piceance Creek basin—John Lorenz and Anne K. Rutledge	1-21	91
Paleozoics targeted in Denver basin—John C. McCaslin	4-29	117
Colorado law will revoke unitary tax next year	7-15	55
Champlin slates remote Colorado wildcat—John C. McCaslin	9-9	179
Look for more Brandons in Colorado—John C. McCaslin	9-23	159
SFC to hike support for Unocal shale project	10-21	46
Weber hunt stirs interest in NW Colorado—John C. McCaslin	11-18	163
San Juan sag: Cretaceous rocks in volcanic-covered basin, South Central Colo.—Robbie Rice Gries	11-25	109

DENVER BASIN

	Date	Page
Amoco stakes deep Denver basin wildcat—John C. McCaslin	2-4	75
Paleozoics targeted in Denver basin	4-29	117
Pre-Cretaceous Denver basin hunt grows—John C. McCaslin	9-16	125

EASTERN OVERTHRUST BELT

	Date	Page
EXPLORATION/DEVELOPMENT USA: Drilling steady throughout U.S. East, Southeast—John C. McCaslin	3-11	102

EASTERN U.S.

	Date	Page
EXPLORATION/DEVELOPMENT USA: Drilling steady throughout U.S. East, Southeast—John C. McCaslin	3-11	102

FLORIDA (Offshore)

	Date	Page
Interior marks eastern Gulf leases to be offered	8-26	32
Eastern gulf lease sale garners low bid total—Rick Hagar	12-23	28

GULF OF MEXICO

	Date	Page
MMS plans OCS Sale 98 May 22	1-14	45
Solar unit powers gathering platform in gulf	2-25	66
Gulf yields more gas production, discoveries	3-11	52
EXPLORATION/DEVELOPMENT USA: Two brisk Gulf of Mexico plays make area hottest in the U.S.—Rick Hagar	3-11	78
Southland developing several strikes	3-25	46
Shell to develop gulf deepwater tract	3-25	66
Conoco eyes TLP concept for Gulf of Mexico	4-1	50
Tenneco starts up two fields in gulf	4-8	50
More exploration approved in Gulf of Mexico	4-15	31
Rebound seen in Gulf of Mexico drilling/completion costs	4-29	44
Sohio schedules gulf deepwater development	5-6	86
Mobil plans to develop deepwater gulf strike	5-13	84
Deep water, Mobile Bay tracts spark Sale 98—Rick Hagar	5-27	46
GAO: Trim gulf royalties to encourage EOR	6-3	42
Shell platform to shatter water depth record	6-17	78
Consolidated gauges big gulf gas well	6-24	43
Development project due in Brazos area	7-8	24
Exploration and development: Gulf Coast Tertiary, 1983—William C. Eisenhardt and Harry T. Holzman	7-8	68
MMS sets terms for Sale 102 in gulf	7-15	46
Odeco to probe for Norphlet pay in gulf	8-5	32
Oil, gas discovery confirmed, strike tested in Gulf of Mexico	8-19	54
Interior marks eastern gulf leases to be offered	8-26	32
Flexure, Mobile Bay trends continue to sizzle	9-9	83
Gulf of Mexico area-wide sales draw kudos from operators—Rick Hagar	10-28	39
Gulf of Mexico hurricane sinks jack up platform	11-4	52
Placid groups advance Flexure development	11-4	56
Current gulf drilling seen adequate	11-18	78
DEEPWATER TECHNOLOGY REPORT: Deepwater activity in gulf—Rick Hagar	12-2	64
Gulf of Mexico gas condensate well blows out	12-16	53
Eastern gulf lease sale garners low bid total—Rick Hagar	12-23	28
Sun prepares to drill second relief well in gulf	12-30	51

IDAHO

	Date	Page
Dry Idaho continues to beckon drillers—John C. McCaslin	9-30	67
Test raises hopes in Basin and Range area—John C. McCaslin	11-4	109

ILLINOIS

	Date	Page
Shawneetown fault zone, Southeast Illinois: structure and petroleum possibilities—D. K. Lumm and W. J. Nelson	6-17	144

KANSAS

	Date	Page
New Kansas gas pipeline plans start-up soon	1-7	48
Kansas Hugoton infill program urged—G. Alan Petzet	2-25	53
EXPLORATION/DEVELOPMENT USA: Midcontinent action tips toward development—G. Alan Petzet	3-11	94
Cities' Hugoton infill plan supported	4-29	52
Hugoton infill plan draws opposition	6-3	37
Hugoton dispute ends; deep exploration set—G. Alan Petzet	7-22	58
Plains eyes Kansas Hugoton field infill project	9-9	72

KENTUCKY

	Date	Page
Drilling scheduled on Kentucky leases	2-25	63

LOUISIANA

	Date	Page
Tenneco revamps Chalmette refinery—W. E. Heck and Ralph Ragsdale	1-14	79
Amoco schedules Louisiana waterflood	4-29	57
DOE to assist Louisiana ethanol project	10-7	54
Adams Resources begins 40 well drilling program	10-28	49
Cogeneration pact approved in Louisiana	11-4	58

LOUISIANA (Offshore)

	Date	Page
Mobil plans to develop deepwater gulf strike	5-13	84
Capsize of barge kills 10 crewmen	5-27	33
Consolidated gauges big gulf gas well	6-24	43
Union groups set two gulf platforms	9-9	77
TXP places W. Cameron 556 on stream	10-21	36
Gulf of Mexico gas/condensate well blows out	12-16	53
Mississippi Sound sale draws four bids	12-16	56

MICHIGAN

	Date	Page
Gas finds stir Michigan deep drilling hunt—John C. McCaslin	6-10	163
Shell asks spacing near Michigan gas strike in Ordovician	7-15	66
Michigan reef wells finally go on stream—John C. McCaslin	8-26	83
West Michigan basin draws deep gas hunt—John C. McCaslin	10-28	139
Sun opening two Michigan gas plants	12-16	54
Deep search still brisk in Michigan basin—John C. McCaslin	12-30	161

MISSISSIPPI

	Date	Page
The geology of Oakvale field—Tim Moore	2-4	77
Transco appeals Mississippi ratable take decision	2-18	59
Southland developing several strikes	3-25	46
Black Warrior basin yields deep gas find—John C. McCaslin	10-21	119

MISSISSIPPI (Offshore)

	Date	Page
Mississippi offshore leases draw little interest	1-21	44
Norphlet gas pay extended to waters off Mississippi	4-29	54
Mississippi plans reoffering of offshore leases	7-29	76

MONTANA

	Date	Page
Montana to equalize severance tax on oil, gas	6-17	74
CO_2, enhanced oil recovery in an 'new' Montana oil province: Sweetgrass arch—Dr. J. Henri N. Wennekers	7-15	147
ANNUAL GEOPHYSICAL REPORT: Seismic profile across the leading edge of the fold and thrust belt of SW Montana—David A. Lopez and Christopher Schmidt	10-7	71

NEBRASKA

	Date	Page
Cretaceous province yields Paleozoic find—John C. McCaslin	7-22	121
Pre-Cretaceous Denver basin hunt grows—John C. McCaslin	9-16	125

NEVADA

	Date	Page
Test raises hopes in Basin and Range area—John C. McCaslin	11-4	109
Hydrocarbons in the northern Basin and Range, Nevada and Utah—Louis C. Bortz	11-11	117

NEW JERSEY

	Date	Page
Power unit to tap gas pressure reduction	3-25	57
Part of New Jersey refinery back on stream	7-1	35
Texas Eastern system to grow in Pennsylvania, New Jersey	8-26	43
Cogeneration plant due in New Jersey	11-18	74

NEW MEXICO

	Date	Page
Gulf to launch New Mexico waterflood	2-11	46
Southland developing several strikes	3-25	46
Gulf plans Tucumcari basin wildcat—John C. McCaslin	6-3	85
New gas find heats up Tucumcari play—John C. McCaslin	7-1	69
Permian basin CO_2 floods mushroom; more scheduled—Rick Hagar	7-8	17
Operators hunt for oil in big gas province—John C. McCaslin	7-8	67
Design of Cortez CO_2 system detailed—Don W. Barry	7-22	96
Growth faults bounding Albuquerque basin may have created hydrocarbon traps—Lee A. Woodward	7-22	131
Holbrook basin area awaits drill bit—John C. McCaslin	8-12	111
Big San Juan development program seen	9-9	70
Sun to sell some New Mexico, Texas producing leases	10-14	45

NEW YORK

	Date	Page
EXPLORATION/DEVELOPMENT USA: Drilling steady throughout U.S. East, Southeast—John C. McCaslin	3-11	102
Ordovician stratigraphic hydrocarbon entrapment potential of Appalachia—Gerald J. Henderson and Carolyn M. Timm	4-29	118
Bass Islands trend draws drilling interest—John C. McCaslin	7-29	161

NORTH DAKOTA

	Date	Page
First U.S. Sulfreen unit in Dakota gas plant—G. W. Davis	2-25	108
Tax relief efforts stalled in two states	3-4	46

OHIO

	Date	Page
Economic profile of Ohio's Clinton sand—J. T. Cumberlidge and W. D. McCullough	5-13	91
An overview of hydrocarbon production in Appalachian basin—a glance at the forest—Patrick J. Burns and Robert C. Claus	8-12	116
Sun completes big Toledo refinery turnaround	12-9	28

OKLAHOMA

	Date	Page
EXPLORATION/DEVELOPMENT USA: Midcontinent action tips toward development—G. Alan Petzet	3-11	94
Hardeman drilling moves into Oklahoma—John C. McCaslin	4-22	133
Landsat-4 data due on Oklahoma area	5-13	142
Sohio task group finds better completion techniques for Anadarko basin gas wells—C. C. Clement, S. F. Maness, and C. M. Mason	8-26	71
Declining natural gas prices take toll of operations in Anadarko basin—G. Alan Petzet	10-21	25
Cogeneration plant due in Oklahoma	10-28	59
Small refinery to reopen in W. Oklahoma	11-11	33

OREGON

	Date	Page
Leasing reflects high hopes in Northwest—John C. McCaslin	3-4	131
Oregon's Mist field drawing new interest—John C. McCaslin	4-8	117
Firm slates geothermal wells in Oregon	4-22	139
Firms step up exploration in Oregon gas area	7-29	74
Hunt intensifies near Oregon's Mist field—John C. McCaslin	8-5	115
Washington and Oregon—Are there other rocks to explore?—F. Tom Ise	8-12	112
The Columbia basin—1: Tectonic model for formation of Columbia basin: implications for oil, gas potential of North Central Oregon—Steven G. Fritts and Larry H. Fisk	8-26	84
The Columbia basin—1: Structural evolution of south margin—relation to hydrocarbon generation—Steven G. Fritts and Larry H. Fisk	9-2	85

OUACHITA OVERTHRUST BELT

	Date	Page
Hydrocarbon distribution: Ouachita overthrust belt—Philip A. Chenoweth	7-22	122

OVERTHRUST BELT

	Date	Page
EXPLORATION/DEVELOPMENT USA: Rocky Mountain drilling action slips from higher 1984 levels—Bob Tippee	3-11	88

PENNSYLVANIA

	Date	Page
Financial risk stymies hunt in Pennsylvania—John C. McCaslin	3-18	163
Ordovician stratigraphic hydrocarbon entrapment potential of Appalachia—Gerald J. Henderson and Carolyn M. Timm	4-29	118
SE Pennsylvania hosts unusual wildcat—John C. McCaslin	5-27	123
Bass Islands trend draws drilling interest—John C. McCaslin	7-29	161
Texas Eastern system to grow in Pennsylvania, New Jersey	8-26	43
Sun hikes Marcus Hook refinery product margins	11-11	30
Brine treatment plant starts up in Pennsylvania	11-25	50

ROCKY MOUNTAINS

	Date	Page
EXPLORATION/DEVELOPMENT USA: Rocky Mountain drilling action slips from higher 1984 levels—Bob Tippee	3-11	88
Texaco eyes potential of new Rockies area—John C. McCaslin	3-11	145
Minnelusa fever breaks out in the Rockies—John C. McCaslin	4-15	81
Chevron pipelines taking shape in Rocky Mountains	8-12	48
Air-drilling practices in the Midcontinent and Rocky Mountain areas can yield big savings—J. S. Sheffield and J. J. Sitzman	9-9	133

TEXAS

	Date	Page
Northern Natural plans to start laying W. Texas CO_2 pipeline	2-4	42
Exxon plans more CO_2 floods in West Texas	2-4	42
Two Texas cogeneration projects advancing	2-11	29
Classification test sought for Panhandle wells	2-18	52
Oil accumulation, production characteristics, targets for added recovery in Texas reservoirs—1—Noel Tyler, W. E. Galloway, C. M. Garrett Jr., and T. E. Ewing	2-25	123
Agency sees 1986 slump in Texas drilling	3-4	66
Amoco to add Texas City alkylation unit	3-4	66
Oil accumulation, production characteristics, targets for added recovery in Texas reservoirs—2—Noel Tyler, W. D. Galloway, C. M. Garrett Jr., and T. E. Ewing	3-4	133
Houston Natural to extend gas pipeline in South Texas	3-11	66
Contract let for West Texas CO_2 line	3-25	48
Texas considering imposition of well completion fee	3-25	49
Gulf Coast cogeneration projects advancing	3-25	58

	Date	Page
Unipol plant complete at Texas complex	4-8	62
Shell building gasification unit at Texas refinery	4-29	51
MidCon plans Texas, Midwest pipeline work	5-20	40
TRC orders well retests in 11 Panhandle fields	5-20	48
Case history of Texas' largest blowout shows successful techniques on deepest relief well—Robert D. Grace	5-20	68
Tectonic and hydrocarbon maturation history in the Permian basin—Ralph L. Horak	5-27	124
Texas Gulf Coast refiners build bank of lead credits	7-1	26
Mitchell to hike North Texas production	7-1	27
Cogeneration due at Chocolate Bayou petrochemical site	7-1	33
Permian basin CO_2 floods mushroom, more scheduled—Rick Hagar	7-8	17
Northern to sell cogenerated power in N. Texas	7-15	67
Texas EOR project proposed, another approved	7-22	46
Fisher sees stable Texas oil output	7-22	50
Apache eyes more Gunpoint field drilling	8-5	30
Amuco ignites new South Texas Jurassic play—Walter S. Light Jr.	8-19	142
Du Pont to reduce ethylene capacity at Chocolate Bayou	8-26	37
Panhandle white oil issue heats up—Rick Hagar	9-9	67
Amoco starts up CO_2 recovery plant in big West Texas field	9-9	60
W. Texas CO_2 line picks up customers	9-9	60
Tests of wells in Panhandle show misclassifications	9-16	78
Judge voids TRC order in 'white oil' issue	9-23	58
Firming seen for gas prices in Texas	9-23	64
Acoco schedules another CO_2 flood in Permian basin	9-30	21
TRC orders shut-in for 271 wells in Panhandle	10-1	62
ANNUAL GEOPHYSICAL REPORT: Conducting a large 3D land survey in a densely populated area—an East Texas case history—Barry Burt, Les Denham, and Javaid Durrani	10-7	77
Sun to sell some New Mexico, Texas producing leases	10-14	45
TRC's Panhandle shutin order to stand	10-14	54
Suspected sabotage hits W. Texas line	10-14	67
W. Texas area draws another CO_2 line to serve EOR projects	10-21	42
Adams Resources begins 40 well drilling program	10-28	49
Blasts, fire hit Gulf Coast storage	11-11	38
Drillers plans S. Texas drilling program	12-2	35
Texas spot gas price slips to less than $2	12-2	40
Relief well drilling for blowout in North Texas—G. Alan Petzet	12-9	22
Texas refinery slated to get two new units	12-23	19
Celeron takes steps to protect Texas aquifer	12-30	48

TEXAS (Offshore)

	Date	Page
Shell plans to develop gas field off Texas	3-4	66
Seismic and drilling pin down deep trend structure off Texas	4-1	57
Flex trend yields another oil strike off Texas—Rick Hagar	4-22	56
Sohio schedules gulf deepwater development	5-6	86
No blame assigned in 1983 blowout off Texas	5-13	68
Development project due in Brazos area	7-8	24
MMS sets terms for Sale 102 in gulf	7-15	46
Lease sale off Texas draws weak response—Rick Hagar	8-19	56

UNITED STATES, General

	Date	Page
EXPLORATION/DEVELOPMENT USA: Exploration/development activity due little change in U.S. this year	3-11	71

UTAH

	Date	Page
Kaiparowits basin: an old frontier with new potential—Thomas R. Lyons and Scott Montgomery	1-7	112
Infill program eyeed for Altamont-Bluebell area	3-18	60
Utah areas promise further success—John C. McCasin	5-6	237
Altamont-Bluebell infill drilling action moving up	5-13	65
Petroleum geology of the greater Altamont area, Uinta basin, Utah—Keith Clem	5-20	87
Wildcat to probe northern Paradox basin—John C. McCasin	8-19	141
Hydrocarbons in the northern Basin and Range, Nevada and Utah—Louis C. Bortz	11-11	117
Chevron sells Utah oil field interest	12-16	67

VIRGINIA

	Date	Page
Trenton limestone fracture reservoirs in Lee County, Southwest Virginia—Charles S. Bartlett Jr.	6-10	164

WASHINGTON

	Date	Page
Leasing reflects high hopes in Northwest—John C. McCasin	3-4	131
Washington and Oregon—Are there other rocks to explore?—F. [illegible]	8-12	112

WEST COAST

	Date	Page
EXPLORATION/DEVELOPMENT USA: West Coast operators eye hard-to-extract oil reserves—Bob Williams	3-11	74
West Coast government-industry accord seen	12-16	66

WEST VIRGINIA

	Date	Page
Conoco tests rank W. Virginia gas strike	1-28	[illegible]
Union scores three ways with W. Va. find—John C. McCasin	1-28	157
An overview of hydrocarbon production in Appalachian basin—a glance at the forest—Patrick J. Burns and Robert C. Davis	8-12	[illegible]
Slim hole drilling cuts deepening cost in Appalachian area	8-19	[illegible]

WISCONSIN

	Date	Page
Amoco plans rank Wisconsin wildcat	5-13	84

WYOMING

	Date	Page
Amoco stakes deep Denver basin wildcat—John C. McCasin	2-4	75
Tax relief efforts stalled in two states	3-4	46
Wyoming requires gas contract carriage	3-11	65
Dakota oil, gas pay mushrooms in Wyoming area	3-18	65
Southland developing several strikes	3-25	46
Meeteetse field sparks search for more production in Wyoming's Bighorn basin—Rober G. Wolff and Robert W. Roy	4-8	118
Minnelusa fever breaks out in the Rockies—John C. McCasin	4-15	81
Breakthrough in seismic hole plugging	5-13	144
Texaco drilling deep Big Horn flank test—John C. McCasin	6-24	113
Apache adding Minnelusa reserves in Wyoming basin	7-8	24
Amoco to start Wyoming's first big CO_2 project	8-5	31
Monsanto tests significant Wyoming gas strike	9-2	32
Mitchell sets Wyoming pilot waterflood	11-11	41

INDUSTRY AFFAIRS

WEEKLY FEATURES

Editorials

	Date	Page
Market conditions pose challenges for management in the New Year	1-7	41
New Interior chief should not lose sight of OCS leasing mandate	1-14	23
Treasury's tax proposal a threat to U.S. drilling, energy security	1-21	29
DOE-Interior merger could strengthen U.S. energy policy	1-28	55
Stable natural gas prices make now a good time to end controls	2-4	23
Treasury's tax plan conflicts with aims of Reagan budget	2-11	23
Tax reform plan's principles hard to argue, harder still to achieve	2-18	39
Pushing product into market no way to deal with industry's woes	2-25	43
Superfund should be made more fair, efficient to get important job done	3-4	39
Investor emphasis on breakup values undermines search for future supply	3-11	39
Biggest health effect likely from EPA lead order will be refiners'	3-18	39
Reagan's tough stance on tax hike good news for industry	3-25	39
Tactical change, not a strategic retreat, is key to future of U.S. offshore leasing	4-1	39
Rush for quick takeover profits threatens future industry earnings	4-8	33
U.S. oil product import growth a problem needing closer study	4-15	21
Canada's energy investments will rise if market freedom lasts	4-22	39
Upgraded API equipment quality program deserves industry support	4-29	39
Wrong reasons cited in latest congressional attack on SFC	5-6	71
Offshore permit systems should put drilling first, revenues later	5-13	55
Appeals court ruling highlights need for natural gas law change	5-20	23
End of Mesa's Unocal siege may open new chapter in takeover saga	5-27	23
Industry's minor triumphs in Reagan tax plan will be tested in Congress	6-3	23
Making gas lines more responsive to market the key to FERC proposal	6-10	55
Federal onshore leasing system should be fixed, not redesigned	6-17	55
Discredited theories resurrected to justify higher taxes, reduced oil and gas development	6-24	23
OCS moratoriums are reactions to past circumstances, not current problems	7-1	17
Refinery energy use cuts point to oil industry's new challenges	7-8	15
OPEC meeting masks trends that point to end of oil price slump	7-15	39
Hodel-California agreement on OCS leasing an energy policy disaster	7-22	39
Timing, reasons have never been better for old gas decontrol	7-29	57
Oil import fee proposal symptom of a floundering budget process	8-5	23
U.S. nonenergy policies undermine energy policy's market emphasis	8-12	39
EPA's discharge rules should aim at extending OCS drilling record	8-19	39
OSHA should adapt drilling safety rule to oil field practices	8-26	23
Higher taxes won't fix what's wrong with U.S. fiscal policy	9-2	15
Hodel should get out of California OCS leasing trap by following law	9-9	57
Industry should seek sound U.S. energy policy, not oil import levy	9-16	55
Good reserves news won't be repeated without more drilling	9-23	39
Lingering threat of harmful tax reform hampers investment plans	9-30	15
Block pricing would preserve gas market's main problem	10-7	39
U.S. industry should encourage efforts for more open oil markets	10-14	41
FERC's new rule on gas transport boosts need for market decontrol	10-21	23
Broader tax base the best part of current superfund bills	10-28	37
Balance needed in environmental value, national energy interests	11-4	39
Tax reform deserves an early death, and industry must help pull the plug	11-11	23
Gas producers' market imperiled as pipelines snub FERC rule	11-18	55
Canada's energy security concern an example U.S. should follow	11-25	23
Call for action on U.S. deficit not a request for higher taxes	12-2	25
U.S. gas market can't be repaired until all prices are decontrolled	12-9	15
Bypassed oil investments are best reason for panic in market	12-16	41
Tax reform, gas decontrol will challenge industry in '86	12-16	13
Oil companies active in 1985 show they're in business to stay	12-30	31

	Date	Page
Journally Speaking		
Gas problems linger—G. Alan Petzet	1-7	39
The shellfish conspiracy—Bob Williams	1-14	21
Offshore preparedness—Rick Hagar	1-21	21
Connections—Robert J. Beck	1-28	53
Institutional capital—Marcia Parker	2-4	21
How to train a scout—G. Alan Petzet	2-11	21
Exporting an industry—Bob Tippee	2-18	37
Budgeting in the dark—Gene T. Kinney	2-25	41
Borders and technology—W. D. Moore III	3-4	37
Beyond the gloom—Jim West	3-11	37
New man on the beat—Leo R. Aalund	3-18	37
Saudi achievement—Ted Wett	3-25	37
Completion problems—Jim Leonard	4-1	37
Mulling mergers—Marcia Parker	4-8	31
Arauca's new anthem—Bob Williams	4-15	19
Save get 6—Jim West	4-22	37
Thanks, Daimler and Benz—John L. Kennedy	4-29	37
Seabed cleanup—Rick Hagar	5-6	69
After the restructuring—Gene T. Kinney	5-13	53
Those #%*!*&#! polls—Bob Tippee	5-20	21
Cafe au lait—Leo R. Aalund	5-27	21
We want that freezer!—Michael Obel	6-3	21
Tunnels to Troll?—Roger Vielvoye	6-10	53
Blowout ignites writer—W. D. Moore III	6-17	53
The third dimension—Leo R. Aalund	6-24	21
Digging up the turf—Rick Hagar	7-1	15
More worn out rhetoric—Bob Tippee	7-8	13
Because. That's why—John L. Kennedy	7-15	37
On mature oil provinces—G. Alan Petzet	7-22	37
Rules of forecasting—Robert J. Beck	7-29	55
Arctic crossroads—Bob Williams	8-5	21
Back to work with brine—Michael Obel	8-12	37
Bricks and bouquets—Warren R. True	8-19	37
Who's restructuring?—Gene T. Kinney	8-26	21
A new reality—Ted Wett	9-2	13
A firm company, maybe?—Bob Tippee	9-9	56
California priorities—Bob Williams	9-16	53
Send SASE—W. D. Moore III	9-23	37
Talk about mileage—Jim West	9-30	13
Trends in computers—Rick Hagar	10-7	37
Refiners' supermarket—Richard A. Corbett	10-14	39
EOR's historical strands—Bob Williams	10-21	21
What went wrong—Jim West	10-28	35
Multilevel regulation—G. Alan Petzet	11-4	37
Sabine Pass sentinels—Leo R. Aalund	11-11	21
How they're restructuring—Gene T. Kinney	11-18	53
The Highlands: A9—Warren R. True	11-25	21
Antidote for Murphy—W. D. Moore III	12-2	23
Good for whom?—Michael Obel	12-9	13
More than just pig iron—John L. Kennedy	12-16	39
Wonderland revisited—Elizabeth Drake	12-23	11
The Turtle Club—Bob Tippee	12-30	29
Watching Washington—Patrick Crow		
The Reagan agenda	1-7	51
Reshuffling Energy	1-14	53
Battling Treasury	1-21	42
Winding down ERA	1-28	73
McClure's outlook	2-4	30
A warning on imports	2-11	30
Another look at gas	2-18	53
Quotas and tariffs	2-25	56
Exploring takeovers	3-4	67
Complaining to the boss	3-11	54
More about tariffs	3-18	67
More trouble for SFC	3-25	67
Tax reform's next shoe	4-1	52
More takeover debate	4-8	58
Revenue sharing	4-15	34
ITC's import solution	4-22	67
A view of the future	4-29	54
Environmental shift	5-6	99
Reformed tax reform	5-13	83
Certainty on OCS sales	5-20	51
Great Plains' problems	5-27	36
OCS numbers game	6-3	48
Leveling the field	6-10	69
A last hurrah?	6-17	66
Treasury II pro and con	6-24	43
Focus on OCS issues	7-1	29
Rewriting safety rules	7-8	31
A thumbs down from Eck	7-15	64
Area-wide sale success	7-22	65
Funds for SFC	7-29	75
No F-double-E	8-5	45
Quotes on oil and gas	8-12	46
OSHA II	8-19	46
Constant change	8-26	50
Cutting gasoline volatility	9-2	27
Congressional agenda	9-9	77
Tax reform outlook	9-16	73
More on Hodel's deal	9-23	55
The block billing issue	9-30	33
SFC subterfuge	10-7	59
More on tax reform	10-14	52
Broadsides over synfuels	10-21	30
Taxing pipelines	10-28	65
Tax reform showdown	11-4	51
Cutting SFC funds	11-11	50
Fallout from Juan	11-18	85
Agreement on taxes	11-25	51
Moratorium loses	12-2	50
Tax reform doubts	12-9	29
Gas decontrol revisited	12-16	67
A move to kill SFC	12-23	27
Win for the Gipper	12-30	59
Watching the World—Roger Vielvoye		
OPEC's Christmas	1-7	61
West African scene	1-14	42
North Yemen operations	1-21	33
Iran's export program	1-28	70
Saudi petrochem buildup	2-4	33
Barents hotspot	2-11	37
Sleipner repercussions	2-18	59
Offshore muscle	2-25	49
Flags of convenience	3-4	54
BGC's balancing act	3-11	50
A test for Petroscan	3-18	62
BNOC's demise	3-25	49
EEC's auto exhaust plan	4-1	49
Outlook for jack ups	4-8	51
Spill cleanups	4-15	42
No gas for Northern Ireland	4-22	52
European EOR	4-29	51
Offshore discontent	5-6	89
Privatizing BGC	5-13	65
Onshore accent in Spain	5-20	33
OPEC oil outlook	5-27	35
Probing the Barents	6-3	40
British distinctions	6-10	75
Avoiding the 'bends'	6-17	69
U.K. royalty crude	6-24	38
U.K. offshore R&D	7-1	33
Quasco's assignment	7-8	29
OPEC and Platform C	7-15	49
Timing the Britoil sale	7-22	52
Mossmorran achievements	7-29	68
BGC can't wait	8-5	43
OPEC's falling rig count	8-12	56
Tanker surplus persists	8-19	67
Cleaning up the sea	8-26	41
Nigeria first	9-2	25
Saga's surprise in Benin	9-9	68
A nod from Cnooc	9-16	78
Bullish on U.K. North Sea	9-23	59
Saxon 'T' block bidding	9-30	29
Iran-Iraq war heats up	10-7	67
Selling Norwegian gas	10-14	50
Oil price outlook	10-21	50
Yemen's bright prospects	10-28	49
Malaysia's privatization	11-4	39
Privatizing BGC	11-11	30
IPAC: invest here	11-18	63
Energy Advocates	11-25	49
Norway's deep water	12-2	49
Business under fire	12-9	23
Fuel from waste	12-16	60
Free market for gas?	12-23	75
Tunisian-Libyan boundary	12-30	57
COMPANIES (General News)		
Independent producers tapping new sources of capital—Marcia A. Parker	1-7	43
How Maze Exploration tapped the venture capital market	1-7	44
Texaco Canada buys Canadian Reserve for $495 million	1-7	61
Shareholders challenge Phillips recapitalization	1-14	32
Oxy, Diamond Shamrock merger pressure up	1-14	32
Panhandle Eastern agrees to pay Lachmar costs	1-14	47
Mapco completes most of planned assets sales	1-21	36
Mobil directors propose antimerger plan	1-21	36
HL&P signs big cogeneration pact with Dow	2-4	37
Public programs' 1984 shales show sharp drop	2-4	33

	Date	Page
Phillips changes plan, seeks to block Icahn bid	2-11	53
Chevron, Texaco takeovers of Canada companies okayed	2-18	53
Icahn boosts tender offer for Phillips stock	2-18	56
Ashland: Hike tariffs, place quotas on gasoline imports	2-18	67
Tax, market questions cut 1985 U.S. oil industry spending plans	2-25	45
Ketelsen laments investment tactics that break up oil firms	3-4	62
Agreement could speed Shell takeover	3-4	62
Mobil moves to ward off takeovers	3-4	62
Bankruptcy request hits Kendavis units	3-4	65
El Paso unit, Milestone become Meridian Oil	3-11	46
More takeover attempts hit the news	3-11	62
InterNorth diversifying energy market—Rick Hagar	3-11	64
AAPG president: Takeovers, taxes could extend downturn	3-18	51
Indiana Standard sounds warning on Treasury tax plan	3-18	57
U.S. corporate battles ebb and flow	3-18	58
Price paid for Petrofina Canada at issue	3-18	65
Southland developing several strikes	3-25	46
Britoil to strengthen oil, gas foothold in U.S.	3-25	54
Firms back emergency fair sharing of oil	3-25	59
Kendavis firms seek Chapter 11 protection—G. Alan Petzet	3-25	62
Industry restructuring key factor in OGJ group's 1984 profits dip—Robert J. Beck	4-1	41
Pogo wins first round in take or pay case	4-1	60
U.S. bans delivery of Celeron's European pipe	4-8	44
Unocal resisting possible takeover attempt by Mesa	4-8	62
Mesa bid for Unocal keeps takeover action hot	4-15	39
Unocal fights Mesa bid with debt-for-stock offer	4-22	57
Polysar to acquire full interest in Petrosar	4-22	61
Debt loads called key to activity of big firms	4-29	62
Unocal presses fight against Mesa takeover bid	4-29	65
Transco's discount program recaptures share of gas sales—Rick Hagar	5-6	82
Mesa, Unocal waging takeover battle in court	5-6	98
ARCO outlines plan for broad restructuring	5-6	98
ARCO: Industry in era of fundamental change	5-13	70
HNG/InterNorth to be longest U.S. gas system	5-13	70
Restructuring helps take slice out of OGJ group earnings—Robert J. Beck and Glenda E. Smith	5-20	25
Three firms outline more restructuring moves	5-20	32
Allied, Signal reach merger agreement	5-20	32
Unocal-Mesa battle builds; spending cuts seen	5-20	34
Oil firms deny claims of jacket, pile dumping	5-20	38
Parker rigs get work in four countries	5-20	50
Lease filing firm hit with $700,000 redress payment	5-27	35
Unocal, Mesa and takeover scuffle—Bob Williams	5-27	41
Hammer: Unocal victory could signal end to merger fever	5-27	42
Valero tries to block InterNorth-HNG merger	5-27	42
Comment: Further jolting changes await U.S. gas pipeline companies—J. M. Seidl	5-27	43
Comment: Who must decide what's best for oil firms and shareholders?—Harold H. Hammer	6-3	30
Firm to acquire control of Gulf Canada	6-3	31
Statoil aims for integrated, international scope	6-3	32
Profits slide for OGJ group of firms—Robert J. Beck and Glenda E. Smith	6-10	[illegible]
Royal Dutch/Shell to buy interest in Oxy's Llanos assets	6-10	75
Transco to acquire Exchange oil firm	6-17	36
Shell acquired; Kendavis units challenge banks	6-17	64
InterNorth to sell some Houston Natural assets	6-17	68
U.S. exploration/production budgets trimmed	6-17	73
Tenneco to buy certain Goodyear natural gas assets	6-24	49
ARCO to sell U.S. Northeast downstream assets	7-1	19
Exxon hit with big judgment in Hawkins case	7-8	26
Houston refinery, Northeast marketing for sale	7-15	48
Foreign investors hike flow of capital to U.S. operations—Marcia A. Parker	7-22	41
How a British company's subsidiary operates in the U.S.	7-22	44
Shareholders clear HNG, InterNorth merger	7-22	54
MIDYEAR FORECAST REVIEW: U.S. oil demand rise due in '85 after rebound in second half—Robert J. Beck	7-29	84
MIDYEAR FORECAST REVIEW: U.S. due another drop in number of active rigs—John C. McCaslin	7-29	106
Deliveries increase under petroleum futures contracts	8-5	35
Public fund sales decline sharply in first half of 1985	8-5	40
Deal reinstated for purchase of Gulf Canada Ltd.	8-12	36
Mergers' effect on U.S. drilling activity at issue	8-12	52
Firms adjust to outlook for continued weak prices	8-19	41
MidCon/United Energy set $1.14 billion merger	8-19	55
State firm to buy big part of Gulf Canada assets	8-19	56
Restructuring in second quarter key part of first half profit slump—Bob Beck	9-2	17
Petrocan's Gulf purchase draws fiery defense	9-2	26
Total 1984 U.S. earnings drop for Chase group	9-2	34
Chevron to close bidding on certain downstream assets	9-9	58
Peru rescinds contracts with Oxy, Belco	9-9	77
OGJ 400 REPORT: OGJ 400 reflects industry's restructuring	9-9	83
Oil companies push marketing, cost cutting to fortify earnings—Michael Ober	9-16	77
Phillips moving ahead in asset sale program	9-16	81
Transco to close purchase of Exchange	9-23	48
Exxon restructures gas transmission, marketing functions—Rick Hagar	9-23	65
Sun to form master limited partnership	10-7	65
Sun to sell some New Mexico, Texas producing leases	10-14	45
Cabot to sell Westar pipeline system	10-28	57
Burlington moves to buy Southland Royalty	10-28	58
Phillips earmarks more assets for auction block	10-28	58
Master limited partnerships set fund sale pace	10-28	59
INDEPENDENT OPERATIONS REPORT: Last year's economic recovery for U.S. independents fizzles in first half of '85—Jim West	10-28	71
INDEPENDENT OPERATIONS REPORT: Master limited partnerships help companies attract capital—Darrell J. Egertson	10-28	92
U.S. independent operators fear deadly blow from tax increase	11-4	41
BP investing for power base in Southeast Asia—Roger Vielvoye	11-4	52
Placid groups advance Flexure development	11-4	56
U.S. Steel to acquire TXO for about $5.4 billion	11-4	60
Columbia to use FERC's nondiscriminatory carriage rule	11-4	66
Southland board rejects Burlington takeover bid	11-11	33
Norsk firm seeks stake in Lysekil refinery	11-11	33
New World Bank agency aims to help foreign fund flow	11-11	34
Sales near for some Chevron downstream assets	11-18	69
Amerada Hess to buy Monsanto U.K.	11-18	70
Creditors to hear Kendavis reorganization plan	11-18	77
API REPORT: Restructuring shifts focus of oil industry	11-18	87
API REPORT: Chevron's restructuring spurring innovation—Bob Williams	11-18	93
API REPORT: Phillips keeps eye on balance sheet in broad restructuring—G. Alan Petzet	11-18	100
API REPORT: Amoco's changes seen as assets repositioning, not restructuring—Bob Tippee	11-18	108
API REPORT: ARCO seeks streamlined look, backs away from wildcatting—Bob Williams	11-18	116
API REPORT: LL&E cuts costs, sheds nonoil, nongas assets—Rick Hagar	11-18	122
API REPORT: Diamond Shamrock's four-point plan balances values, flexibility—Rick Hagar	11-18	124
Jury votes huge award to Pennzoil by Texaco	11-25	34
Joint venture kills Can-Am line project	11-25	34
Major companies fine tune strategy	11-25	46
Seventeen bidders seek to buy SPR oil	12-2	36
Monsanto sells balance of oil, gas assets	12-2	44
Petro-Canada: How it grew and where it's likely going	12-9	17
Petro-Canada assessing move toward privatization	12-9	19
Chevron to sell Hill property to [illegible]	12-9	20
Five companies buy SPR crude in test drawdown	12-9	29
Sohio plans big writedowns, less exploration	12-9	33
Nine-month OGJ group profits down—Bob Beck	12-9	34
Amerada Hess trims refining, marketing	12-9	36
OCAW: oil companies [illegible] in '86—Michael Ober	12-16	43
Swearingen, Pickens differ on takeover effects	12-16	45
Herold says many recent oil mergers bad deals	12-16	48
Judge upholds costly Texaco decision	12-16	50
Mobil gets Canadian Superior, sells [illegible]	12-16	51
Institutional investors favor oil stocks	12-16	52
TransCanada forms gas marketing unit	12-16	54
Sun opening two Michigan gas plants	12-16	54
Chevron sells Utah oil field interest	12-16	67
Reformer explodes at ARCO's Watson refinery	12-16	68
Sharp drop seen in funds needed to meet gas demand	12-23	20
More merger action pops up in U.S. industry	12-23	31
Court delays bond requirement in Texaco case	12-23	32
Mobil agrees to sell W. German refinery	12-30	38
Chevron advances downstream revamp	12-30	43
Oxy to press battle to drill in Los Angeles area	12-30	49
MidCon moves to ward off takeover attempt	12-30	54
Alaskan pipeline agrees to settlement of royalty dispute	12-30	58

FORECASTS, TRENDS, STATISTICS, SURVEYS

	Date	Page
Independent producers tapping new sources of capital—Marcia A. Parker	1-7	43
FORECAST/REVIEW: U.S. demand rebound to weaken in '85—Robert J. Beck	1-28	87
Adoption of Treasury's tax plan would deal crippling blow to industry	2-18	41
British agency predicts big gains in offshore outlay	2-18	56
Tax, market questions cut 1985 U.S. oil industry spending plans	2-25	45
Comment: Questions facing the independent operator—A. M. Schemenz	3-4	146
World crude, condensate flow in '84 logs first increase since '79—Bob Beck and Mike Ober	3-11	41
Communist countries show slight 1984 production gain	3-11	43
Industry restructuring key factor in OGJ group's 1984 profits dip—Robert J. Beck	4-1	41
EIA reports U.S. energy output, demand gains	5-13	76
Restructuring helps take slice out of OGJ group earnings—Robert J. Beck and Glenda E. Smith	5-20	25

	Date	Page
Profits slide for OGJ group of firms—Robert J. Beck and Glenda E. Smith	6-10	72
Projections up for total energy demand by IEA nations in 1990—Roger Vielvoye	6-17	57
Chevron sees very slow rise in oil consumption	6-24	48
Competition, partial decontrol pose challenge to U.S. natural gas industry—Rick Hagar	7-1	19
Comment: Resolve conflicting interests to improve U.S. gas industry—Vinod K. Dar	7-1	24
Herrington sees 'little threat' from oil loss in tax reform	7-1	32
Comment: KPC: No threat from OPEC downstream move—Nader H. Sultan	7-15	57
Foreign investors hike flow of capital to U.S. operations—Marcia A. Parker	7-22	41
MIDYEAR FORECAST REVIEW: U.S. oil demand rise due in '85 after rebound in second half—Robert J. Beck	7-29	89
MIDYEAR FORECAST REVIEW: U.S. due another drop in number of active rigs—John C. McCaslin	7-29	106
Deliveries increase under petroleum futures contracts	8-5	35
Firms adjust to outlook for continued weak prices	8-19	41
Restructuring in second quarter key part of first-half profit slump—Bob Beck	9-2	17
Total 1984 U.S. earnings drop for Chase group	9-2	34
First half world oil flow fails to sustain 1984 increase	9-9	59
Soviet Union's slump trims Communist oil production	9-9	61
Enhanced recovery boosts U.S. crude reserves	9-9	64
OGJ 400 REPORT: OGJ 400 reflects industry's restructuring	9-9	89
Tailspin feared for U.S. gas industry	10-14	48
Comment: Hard times obscure long term viability of petroleum industry—William T. Smith	10-14	68
INDEPENDENT OPERATIONS REPORT: Last year's economic recovery for U.S. independents fizzles in first half of '85—Jim West	10-28	71
INDEPENDENT OPERATIONS REPORT: Forecasting seen difficult in era of restructuring—Ray L. Hunt	10-28	77
INDEPENDENT OPERATIONS REPORT: Care required in raising funds from investors—David Kreuter	10-28	85
INDEPENDENT OPERATIONS REPORT: Hedging in futures market offers degree of price certainty—John Hill	10-28	90
INDEPENDENT OPERATIONS REPORT: Master limited partnerships help companies attract capital—Darrell J. Egertson	10-28	92
INDEPENDENT OPERATIONS REPORT: Price uncertainty makes financial planning vital—J. Robert Murdoch	10-28	98
INDEPENDENT OPERATIONS REPORT: Perspective the key to raising capital from institutions—Richard C. Adkerson, Gary F. VanSchatten, and James A. Hecker	10-28	101
New World Bank agency aims to help foreign fund flow	11-11	34
Futures markets add dimension to petroleum trading—James A. Hayes	11-11	108
API REPORT: Restructuring shifts focus on oil industry	11-18	87
API REPORT: Chevron's restructuring spurring innovation—Bob Williams	11-18	93
API REPORT: Phillips keeps eye on balance sheet in broad restructuring—G. Alan Petzet	11-18	100
API REPORT: Amoco's changes seen as assets repositioning, not restructuring—Bob Tippee	11-18	108
API REPORT: ARCO seeks streamlined look, backs away from wildcatting—Bob Williams	11-18	116
API REPORT: LL&E cuts costs, sheds nonoil, nongas assets—Rick Hagar	11-18	122
API REPORT: Diamond Shamrock's four-point plan balances values, flexibility	11-18	124
Nine-month OGJ group profits down—Bob Beck	12-9	34
Shell forecasts rough going for petroleum industry to 1990	12-23	22
U.S. natural gas industry ends another year full of change	12-30	33
Free market seen dominating U.S. natural gas industry	12-30	36
Comment: Policy proposals demonstrate wrong moves on U.S. oil, gas—Charles J. DiBona	12-30	50
WORLDWIDE REPORT: World oil production down 1.7% in 1985	12-30	63

IMPORTS AND EXPORTS

	Date	Page
NEB opposes $2.30 Mcf gas export price	1-7	70
Dutch gas exports to West Germany extended	1-14	47
Panhandle Eastern agrees to pay Lachmar costs	1-14	47
Commerce to clarify legal restrictions on oil exports	1-28	82
Canada reduces tax on oil exports to U.S.	2-4	37
Alaskan LNG exports to Orient due study	2-4	43
How to meet overseas content laws—Henry T. DeNero and Amir Mahini	2-4	68
Canadian gas exports show increase	2-11	46
Treasury's tax plan would boost outlay for oil imports	2-18	43
Canada sees 17.5% gain in gas exports to U.S.	2-18	58
Ashland: Hike tariffs, place quotas on gasoline imports	2-18	67
Imports weaken U.S. product markets	3-4	50
Canadian exports show 1984 increase	3-25	54
TransCanada revamps plan to hike gas exports	4-8	44
U.S. bans delivery of Celeron's European pipe	4-8	44
Move for U.S. product protections hit	4-8	49
More Canadian gas destined for U.S.	4-29	65
Soviet energy exports in 1984 hit record level	5-13	74
Small U.S. refiners cite product imports threat	5-20	50
U.S. in no rush to rescue small refiners hurt by product imports—Patrick Crow	5-27	25
China due more U.S. drilling imports	6-3	38
Increasing volumes of Canadian gas seen U.S. bound	6-17	83
IRC warns of jolt from rise in products imports	6-24	30
Increase in Soviets' revenue from oil exports tapering off	7-8	23
Japanese utilities agree to import LNG from Thailand	7-8	29
Application filed for first exports of Venture gas	7-22	57
Three nations accused of dumping OCTG	7-29	85
Shell to convert Montreal-Portland line for gas exports	8-26	34
U.S. oil import duty urged to bolster drilling	8-26	40
LNG shipments to Orient seen best outlet for North Slope gas	9-9	76
Venture gas due separate export hearing	9-9	83
Venezuela to U.S.: Don't impose oil import fee	9-23	66
Japan urged to lift import bans, trim refining	10-7	54
Iran's oil exports seen cut sharply for several months	10-14	61
Japanese bill would lift product imports ban	10-21	43
CIA jumps estimate of Soviet oil exports	11-4	54
Cook Inlet crude oil exports approved	11-4	67
Hike in Canadian gas exports to U.S. at issue	12-2	36

LABOR

	Date	Page
OCAW, oil companies negotiate contracts that expire early in '86—Michael Obel	12-16	43
OCAW resorts to membership drive	12-16	45
OCAW's Misbrener issues strike warning	12-23	31

MARKETING AND PRICES

General

	Date	Page
Oil companies push marketing, cost cutting to fortify earnings—Michael Obel	9-16	57
Reduced prices spark purchases of oil and gas reserves in U.S.—G. Alan Petzet and Elizabeth Drake	10-14	43
INDEPENDENT OPERATIONS REPORT: Price uncertainty makes financial planning vital—J. Robert Murdoch	10-28	98
Stocks to play smaller role in meeting winter fuel demand—Bob Beck	12-2	27

Crude and refined products

	Date	Page
Markets reject OPEC price efforts—Roger Vielvoye	1-7	62
Kuwait Petroleum moving to market unleaded gasoline	1-14	53
Price slide means no WPT for some U.S. crude	1-21	34
U.S. crude oil, natural gas prices continue to tumble	1-21	35
Europe's chill eases price pressures on OPEC—Roger Vielvoye	1-21	49
OPEC price cuts draw mixed market response	2-4	31
Comment: What lies behind those weak prices for petroleum products—Philip K. Verleger Jr.	2-25	59
Imports weaken U.S. product markets	3-4	50
AGA: Falling oil price means boost for gas sales	3-11	67
Move for U.S. product protections hit	4-8	49
Akins: OPEC output lid to buoy prices	4-15	32
Crude price rebound seen by second half 1985	4-22	59
Aussies cut import parity price of crude oil	7-8	34
Keller: Market jitters won't trim much from crude oil price	7-22	66
OPEC orders slight cut in price of heavy crude—Roger Vielvoye	7-29	73
Firms adjust to outlook for continued weak prices	8-19	41
Arthur Andersen: Wrong price forecasts cost billions	8-19	44
EIA sees drop in crude, gasoline prices	8-26	34
Saudis' refiner netback contracts push OPEC to brink of price war—Roger Vielvoye	9-23	41
Reduced prices spark purchases of oil and gas reserves in U.S.—G. Alan Petzet and Elizabeth Drake	10-14	43
Ashland foresees persistent slide in prices for crude oil	10-14	59
OPEC fails to act on price, production—Roger Vielvoye	10-14	60
Spot sales of Alberta crude oil in U.S. deferred	10-28	65
INDEPENDENT OPERATIONS REPORT: Hedging in futures market offers degree of price certainty—John Hill	10-28	90
Futures markets add dimension to petroleum trading—James A. Hayes	11-11	108
Saudi crude production hike could trim prices further	11-18	84
OPEC threat triggers crude price drop—Roger Vielvoye	12-16	61

Natural Gas

	Date	Page
NEB opposes $2.30 Mcf gas export price	1-7	70
Hodel renews push for decontrol of gas prices	1-14	44
AGA: Declining prices hold advantage for gas	1-21	34
U.S. crude oil, natural gas prices continue to tumble	1-21	35
More growth seen for spot gas market in U.S.	2-4	43
Tenneco predicts persistent U.S. gas deliverability surplus	2-18	58
Natural-gas tax credit after control—John L. Wilson	2-18	87
Ingaa tracks special gas marketing programs	2-25	62
Panhandle Eastern cuts Midcontinent natural gas prices	3-4	67
Indonesia's plant gate natural gas price at issue	3-11	57
U.S. spot gas market price less than $3 MMBTU	3-11	58
Wyoming requires gas contract carriage	3-11	65
AGA: Falling oil price means boost for gas sales	3-11	67
Pogo wins first round in take or pay case	4-1	60

	Date	Page
Trunkline to understate purchase gas costs	4-8	50
Coal and natural gas winning U.S. bulk fuel battle with oil—Rick Hagar	4-22	41
Transco's discount program recaptures share of gas sales—Rick Hagar	5-6	82
FERC says gas market requires policy changes	5-13	82
Panhandle starts gas discount program	5-13	82
Two spot gas sales programs stricken	5-20	46
End to interstate spot gas market seen possible in June	5-20	47
Competition, partial decontrol pose challenge to U.S. natural gas industry—Rick Hagar	7-1	19
Congress in no hurry to decontrol more wellhead prices—Patrick Crow	7-1	20
Two lines shuck take or pay clauses—Rick Hagar	7-15	65
Columbia to trim more wellhead prices	7-22	57
NGPL voids contract take or pay obligations	7-29	64
Clearinghouse eyes spot sales of Canadian gas	7-29	65
Line again invokes market out clause	8-12	48
Firms asjust to outlook for continued weak prices	8-19	41
Smaller gas sales ruled out for force majeure	8-19	65
California utilities make major spot market gas purchases	8-26	28
Slumping gas prices trim tight sand requests	8-26	33
Transmission lines step up contract carriage	8-26	36
Battle continues over gas purchase contracts	8-26	42
Ingaa survey pinpoints renegotiated gas prices	8-26	44
AGA: Contract renegotiation needs FERC boost	9-16	74
Ingaa tally pinpoints increase in special marketing programs	9-23	62
Firming seen for gas prices in Texas	9-23	64
Reduced prices spark purchases of oil and gas reserves in U.S.—G. Alan Petzet and Elizabeth Drake	10-14	43
Tailspin feared for U.S. gas industry	10-14	48
Declining natural gas prices take toll of operations in Anadarko basin—G. Alan Petzet	10-21	25
Comment: Marketing cooperative offers independents a way to sell gas—Michael O. Landers	10-21	32
Issue of Canadian gas prices growing hotter	10-21	40
Industry applauds delay of gas block pricing	10-21	41
Comment: Contract sanctity, regulations top concerns of gas producers—Nicholas J. Bush	10-28	66
Ottawa's move on gas prices, frontiers hailed	11-11	36
Buyers snapping up Canadian gas at reduced prices	11-11	36
U.S. gas market spawns flurry of developments	11-18	66
Disruption from Order 436 called temporary	12-2	38
Texas spot gas price slips to less than $2	12-2	40
U.S. natural gas industry ends another year full of change	12-30	33
Free market seen dominating U.S. natural gas industry	12-30	36

POLLUTION AND ENVIRONMENTAL CONTROL

EPA proposes 'banking' of lead usage rights	1-14	45
MMS may tighten air quality rules off California	1-14	52
Refiners split over EPA's lead bank proposal	1-28	81
EPA orders gasoline lead phasedown	3-11	56
Refiners pressed by gasoline lead cuts	4-1	62
EPA spells out lead banking regulations	4-1	64
U.S. refiners fret over octane requirements	5-27	32
Lead phasedown seen hiking naphtha options	6-3	47
State moves to regulate wastes to hit industry with added costs	6-24	25
Participants sought for environment research group	6-24	28
EPA to propose stiffer offshore discharge rules	8-19	59
U.S. refiners bank 3.3 billion g of lead rights	9-23	58
House bill would stiffen cleanup 'superfund'	10-21	34
House measure would expand cleanup fund	10-28	55
Leasing challenged in Yellowstone ecosystem	11-4	50
Hodel seeks to end dispute on California OCS emissions	11-18	72
U.S. refiners poised for move into next lead phasedown step—Michael Obel	12-23	15
API: EPA's Stage II vapor recovery program too costly	12-23	19
Oxy to press battle to drill in Los Angeles area	12-30	49

RELATED ENERGIES

General

SFC concedes lack of urgency for U.S. synfuels	1-28	74
WORLDWIDE CONSTRUCTION REPORT: Related Fuels—Ailleen Cantrell	4-22	119
Opposition to SFC builds among lawmakers	4-29	59
SFC poised to revamp support for Great Plains	6-24	46
SFC pushes grants for three projects	9-9	75
SFC, its future cloudy, still conducting business	9-16	75
SFC award sparks more controversy	9-30	24
WORLDWIDE CONSTRUCTION REPORT: Related Fuels—Ailleen Cantrell	10-21	103
Senate votes to cut SFC's funding by one-half	12-16	48

Coal

Coal, resid coprocessing to be studied	1-14	34
Soviets start up coal liquefaction plant in Tula region	1-14	34
Coal and natural gas winning U.S. bulk fuel battle with oil—Rick Hagar	4-22	41
Shell building gasification unit at Texas refinery	4-29	51
U.K. agency plans pilot coal liquefaction plant	6-3	42
SFC poised to revamp support for Great Plains	6-24	46
Cool Water calls first year 'highly successful'	7-1	27
SFC approves Great Plains gas price guarantees	7-22	60
Coal to cut steam generation costs for Quaker State	7-29	61
Great Plains gas-from-coal plant denied vital aid	8-5	31
DOE reviewing options for Great Plains facility	8-12	62
Herrington gives Great Plains short reprieve	8-26	36
DOE backs studies of indirect coal conversion	9-16	74
Cool Water plant hits 80% of capacity	11-18	69

Electricity

HL&P signs big cogeneration pact with Dow	2-4	37
California EOR, cogeneration sales are gas line targets	2-11	29
Two Texas cogeneration projects advancing	2-11	29
Cogeneration due in Daqing oil field	2-11	53
California cogeneration on the rise—Bob Williams	3-25	56
Power unit to tap gas pressure reduction	3-25	57
Gulf Coast cogeneration projects advancing	3-25	58
Cogeneration due at Chocolate Bayou petrochemical site	7-1	33
Northern to sell cogenerated power in N. Texas	7-15	67
Cogeneration gas market continues to grow	8-5	50
Cogeneration plant under construction for Tosco refinery	8-5	51
Big Kern County cogeneration plant starts up—Bob Williams	10-14	55
Cogeneration plant due in Oklahoma	10-28	59
Cogeneration pact approved in Louisiana	11-4	58
Cogeneration plant due in New Jersey	11-18	74

Geothermal

Firm slates geothermal wells in Oregon	4-22	139
Binary geothermal plant prepares for start-up—Bob Williams	6-24	33
U.S. geothermal retrenching from period of vigorous expansion—Bob Williams	9-30	17
Salton Sea geothermal test spudded	10-28	46
Heber dual flash geothermal project starts up	11-11	49

Shale

SFC to hike support for Unocal shale project	10-21	46
Shale oil helps fuel Soviet power plant	10-28	44
DOE agrees to assist two more oil shale studies	11-25	33

Solar

Solar unit powers gathering platform in gulf	2-25	66

Tar Sands, Oil Sands

Esso eyes expansion of oil sands project	1-28	72
Alberta to rely on oil sands, heavy oil	4-29	57
Syncrude sees no great harm from oil price dip	10-21	29

SUPPLY AND DEMAND

Phillips predicts slower growth in U.S. products use	1-7	57
Energy consumption outlook for selected countries	1-7	66
U.S. lists advance in 1984 total energy demand	1-28	68
FORECAST REVIEW: U.S. demand rebound to weaken in '85—Robert J. Beck	1-28	87
Tenneco predicts persistent U.S. gas deliverability surplus	2-18	58
IEA spells out exploration target	3-4	52
Estimate of potential U.S. gas resource declines	3-25	50
U.S. gas surplus seen persisting possibly until early 1990s	3-25	51
End of U.S. gas bubble, drilling rebound seen	3-25	52
Senate panel about-face would suspend SPR fill	3-25	59
Firms back emergency fair sharing of oil	3-25	59
OTA: Diversify U.S. natural gas supply base	4-1	65
LPG trade seen lower than expected	4-8	42
W. Pacific Basin condensate, naphtha glut seen	4-8	43
Non-Communist oil demand seen rising slowly	5-6	81
EIA reports U.S. energy output, demand gains	5-13	76
Rapid growth seen for Lldpe demand	5-20	42
Pirinc sees rebound in demand for OPEC Oil	5-27	34
IPAA: U.S. 1985 oil, gas demand to rise slightly	6-10	83
Projections up for total energy demand by IEA nations by 1990—Roger Vielvoye	6-17	57
European energy market share fight seen through 2000	6-17	58
House committee opposes halt in filling of SPR	6-24	36
Chevron sees very slow rise in oil consumption	6-24	48
Chevron sees growth in polystyrene market	7-15	50
SPR on schedule to meet 1985 goal	7-22	57
MIDYEAR FORECAST REVIEW: U.S. oil demand rise due in '85 after rebound in second half—Robert J. Beck	7-29	89
Study aims to determine states' role in EOR	9-23	51
NPC to study oil, gas suppy demand future	10-21	42
IPAA sees slight gain in U.S. oil, gas demand	11-4	44
Futures markets add dimension to petroleum trading—James A. Hayes	11-11	108
Stocks to play smaller role in meeting winter fuel demand—Bob Beck	12-2	27
Five companies due SPR crude in test drawdown	12-9	29
Sharp drop seen in funds needed to meet gas demand	12-23	20

GOVERNMENT

CONGRESS

	Date	Page
Tax 'simplification' tops list of energy issues in 99th Congress—Patrick Crow	2-4	25
Key lawmakers agree that budget issues rate No. 1	2-4	27
Senate okays Hodel, Herrington nominations	2-11	49
Archer warns of tough battle against tax revamp proposal	2-18	48
Lawmakers back superfund tax hike	3-4	57
Senate committee approves 'superfund' bill	3-11	52
Senate panel about-face would suspend SPR fill	3-25	59
Firms back emergency fair sharing of oil	3-25	59
OTA: Diversify U.S. natural gas supply base	4-1	65
Groups hit OCS leasing moratoriums	4-1	66
Industry presses case against land lockups	4-8	41
Move for U.S. product protections hit	4-8	49
House panel urges gas line user fees	4-22	44
Opposition to SFC builds among lawmakers	4-29	59
Senate panel to eye bigger superfund	5-6	92
Fine tuning urged for onshore leasing program	5-20	36
SPR freeze seen requiring law change	5-20	36
Small U.S. refiners cite product imports threat	5-20	50
Oil taxes due close look as Congress mulls reform plans—Patrick Crow	6-3	25
GAO: Trim gulf royalties to encourage EOR	6-3	42
House leaders urge expanded SMPs	6-3	42
Full Senate to mull boost in U.S. 'superfund'	6-3	48
Senate's 'superfund' measure may see floor action soon	6-24	27
House committee opposes halt in filling of SPR	6-24	36
Congress in no hurry to decontrol more wellhead prices—Patrick Crow	7-1	20
OHA: Give overcharge collections to Congress	7-15	62
Coastal states seek drainage tract royalty share	8-5	30
GAO evaluation of area-wide leasing draws fire	8-5	42
Congress eyes 'superfund' extension—Patrick Crow	9-2	24
House tax plan would hit industry	10-7	58
House bill would stiffen cleanup 'superfund'	10-21	34
GAO: Interior should retain royalty oil program	10-21	36
House measure would expand cleanup fund	10-28	55
Committee bill carries costly tax provision	12-2	44
Compromise Superfund bill goes to House floor	12-9	22
Senate votes to cut SFC's funding one-half	12-16	48
House hits industry with strict Superfund bill	12-16	56
Tax reform future clouded by House vote	12-16	62
House approves tax reform measure	12-23	26

COURTS

	Date	Page
Transgulf charges marine shippers with harassment	1-28	70
Transco appeals Mississippi ratable take decision	2-18	59
Court throws out wet gas/dry gas offsets	3-11	67
Exxon hit with big judgment in Hawkins case	7-8	26
Jury votes huge award to Pennzoil by Texaco	11-25	34
Judge upholds costly Texaco decision	12-16	50
Court delays bond requirement in Texaco case	12-23	32

DEPARTMENT OF COMMERCE

	Date	Page
Commerce to clarify legal restrictions on oil exports	1-28	82
Foreign trade zone includes refineries	12-16	69

DEPARTMENT OF ENERGY

	Date	Page
DOE picks Boeing for SPR manager	1-7	64
Hodel renews push for decontrol of gas prices	1-14	44
DOE, Interior due new chiefs; merger options to be studied	1-21	48
Senate okays Hodel, Herrington nominations	2-11	49
Administration sets DOE, Interior budgets	2-11	52
Boggs: Tax reform to trim U.S. oil, gas output	2-25	60
DOE sees no big change in U.S. energy picture	2-25	62
EIA reports U.S. energy output, demand gains	5-13	76
SPR freeze seen requiring law change	5-20	36
House committee opposes halt in filling of SPR	6-24	36
Herrington sees 'little threat' from oil loss in tax reform	7-1	32
OHA: Give overcharge collections to Congress	7-15	62
SPR on schedule to meet 1985 goal	7-22	57
Great Plains gas-from-coal plant denied vital aid	8-5	31
DOE reviewing options for Great Plains facility	8-12	62
Herrington: Don't padlock big batch of tracts off California	8-19	58
EIA sees drop in crude, gasoline prices	8-26	34
DOE backs studies of indirect coal conversion	9-16	74
EIA: Tax reform plan no threat to production	9-23	52
DOE to assist Louisiana ethanol project	10-7	54
Test sale of 1.1 million bbl planned from SPR	10-7	57
Devonian shale due horizontal hole, multifracs	11-11	42
Concern over tax reform, DOE gas plan highlight API meeting	11-25	25
DOE proposes regulation ending natural gas vintaging	11-25	26
DOE agrees to assist two more oil shale studies	11-25	33
Seventeen bidders seek to buy SPR oil	12-2	36
Five companies due SPR crude in test drawdown	12-9	29

DEPARTMENT OF THE INTERIOR

	Date	Page
MMS plans OCS Sale 98 May 22	1-14	45
MMS may tighten air quality rules off California	1-14	52
DOE, Interior due new chiefs; merger options to be studied	1-21	48
IPAA: Relax new BLM onshore drilling rules	1-28	81
MMS selects sale tracts in Alaska's Bristol Bay	2-4	32
Senate okays Hodel, Herrington nominations	2-11	49
Administration sets DOE, Interior budgets	2-11	52
BLM, USFS propose to swap land management	2-18	60
Interior trims frontier sales in 5 year schedule	2-25	50
Lease sale area outlined in Norton basin off Alaska	3-25	64
Interior fine tunes OCS lease sale schedule	3-25	64
Groups hit OCS leasing moratoriums	4-1	66
Deepwater lease terms extended	4-1	66
Industry presses case against land lockups	4-8	41
BLM plans to hike bond requirements	5-6	90
Interior eyes noncompetitive leasing changes	5-13	66
Deep water, Mobile Bay tracts spark Sale 98—Rick Hagar	5-27	46
Interior plans to withdraw as WPT middleman	6-17	82
Drilling deadline near for most pre-Flpma leases—Brian Wood	7-1	75
Hodel's goal: certainty in leasing policies and schedules—Patrick Crow	7-15	41
MMS sets terms for Sale 102 in gulf	7-15	46
API urges Interior to retain area-wide leasing	7-15	48
California OCS deal would cut leasing	7-22	62
Coastal states seek drainage tract royalty share	8-5	30
Resource estimate falls for federal areas off the U.S.	8-5	42
GAO evaluation of area-wide leasing draws fire	8-5	42
Lease sale off Texas draws weak response—Rick Hagar	8-19	56
Interior marks eastern gulf leases to be offered	8-26	32
Hodel may revamp tract lockup off California	9-2	23
Hodel's California OCS deal tumbles—Patrick Crow	9-16	68
Interior tentatively schedules 1986 lease sale in Bristol Bay	9-16	70
GAO: Interior should retain royalty oil program	10-21	36
Interior proposes onshore leasing revamp	10-28	67
Alaska seeks delay for North Aleutian basin sale	11-11	41
Hodel seeks to end dispute on California OCS emissions	11-18	72
Talks on California OCS leasing ban at issue	11-18	72
OCS military area bids subject to new rule	12-2	35
Eastern gulf lease sale garners low bid total—Rick Hagar	12-23	28
Interior to proceed with North Aleutian sale	12-23	30

U.S. Geological Survey (USGS)

	Date	Page
USGS study pinpoints Appalachian traps	2-25	68

DEPARTMENT OF JUSTICE

	Date	Page
ARCO Pipe Line agrees to reduce TAPS tariff	1-7	57
Justice: New rules on takeovers not required	6-3	46

EXECUTIVE BRANCH

	Date	Page
Reagan to push Treasury's tax juggling plan	2-11	39
Administration sets DOE, Interior budgets	2-11	52

FEDERAL ENERGY REGULATORY COMMISSION (FERC)

	Date	Page
FERC to assess its gas pipeline policies	1-28	70
FERC judge backs Dorchester in gas case	1-28	82
Producers seek gas transport changes	4-1	59
FERC cites seven firms for gas diversions	4-1	60
FERC says gas market requires policy changes	5-13	82
FERC to broaden access to gas pipelines	6-3	32
Ingaa, AGA assessing new FERC move	6-10	66
Congress in no hurry to decontrol more wellhead prices—Patrick Crow	7-1	20
Two lines shuck take or pay clauses—Rick Hagar	7-15	65
Industry hits FERC's revamp proposal	8-5	44
Cogeneration gas market continues to grow	8-5	50
Slumping gas prices trim tight sand requests	8-26	33
Panhandle white oil issue heats up—Rick Hagar	9-9	67
AGA: Contract renegotiation needs FERC boost	9-16	74
More flak hits FERC restructuring plan	9-30	26
Tax reform, FERC plans blamed for weak drilling activity	10-7	42
More on tax reform	10-14	52
Industry applauds delay of gas block pricing	10-21	41
Ingaa challenges FERC gas transportation rule	11-4	66
Columbia to use FERC's nondiscriminatory carriage rule	11-4	66
FERC issues nondiscriminatory carriage rule	11-11	46
Gas pipelines under fire on Rule 436	11-18	64
Disruption from Order 436 called temporary	12-2	38
Pipelines, distributors see risks in FERC order	12-9	37
FERC relaxes Order 436, abandonment policy	12-16	54
U.S. natural gas industry ends another year full of change	12-30	33

FEDERAL TRADE COMMISSION (FTC)

	Date	Page
FTC lifts Chevron-Gulf 'hold separate'	3-25	65

TAXATION

	Date	Page
Comment: Tax reform must recognize essential role of capital, energy—Richard J. Gonzalez	1-7	52
Comment: U.S. tax proposals carry big reserves, production penalty—John H. Lichtblau	1-14	40

	Date	Page
Andersen survey underscores tax reform jolt	1-14	41
IOCC: Tax plan would hit stripper operations	1-14	41
Price slide means no WPT for some U.S. crude	1-21	34
More states to mull motor fuel tax hikes in 1985	1-21	41
Rocky Mountain area states mulling changes in taxes	1-21	42
IOCC warns of more fallout from tax plan	1-21	50
Treasury official defends plan for big revamp to tax regime	1-28	72
Tax 'simplification' tops list of energy issues in 99th Congress—Patrick Crow	2-4	25
API chairman sounds warning on effect of Treasury's tax plan	2-4	29
IOCC: Treasury tax proposal would reduce EOR	2-4	29
Reagan to push Treasury's tax juggling plan	2-11	39
Adoption of Treasury's tax plan would deal crippling blow to industry	2-18	41
Treasury's tax plan would boost outlay for oil imports	2-18	43
Why the intangible drilling cost tax 'break' is no break	2-18	46
Archer warns of tough battle against tax revamp proposal	2-18	48
Tax plan would force producers' spending cut	2-18	49
Natural-gas tax credit after control—John L. Wilson	2-18	87
Boggs: Tax reform to trim U.S. oil, gas output	2-25	60
Tax relief efforts stalled in two states	3-4	46
Lawmakers back superfund tax hike	3-4	57
Baker, industry agree on key tax reform points	3-4	65
API spells out loss in tax proposal	3-18	54
Indiana Standard sounds warning on Treasury tax plan	3-18	57
Employment, security losses seen from tax plan	5-6	91
Senate panel to eye bigger superfund	5-6	92
Oil taxes due close look as Congress mulls reform plans—Patrick Crow	6-3	25
Plan seen better than predecessor, worse than current law	6-3	28
Full Senate to mull boost in U.S. 'superfund'	6-3	48
Tax plan seen giving nod to CD investments	6-10	76
Independents tackle tax, gas issues	6-10	78
Montana to equalize severance tax on oil, gas	6-17	74
Interior plans to withdraw as WPT middleman	6-17	82
Herrington sees 'little threat' from oil loss in tax reform	7-1	32
Planned elimination of foreign tax credit hit	7-29	78
API study shows oil companies' high U.S. tax rate	9-16	76
EIA: Tax reform plan no threat to production	9-23	52
Tax reform, FERC plans blamed for weak drilling activity	10-7	42
House tax plan would hit industry	10-7	58
Administratin tax plan seen hurting small firms	10-21	44
U.S. independent operators fear deadly blow from tax increase	11-4	41
Concern over tax reform, DOE gas plan highlight API meeting	11-25	25
Committee bill carries costly tax provision	12-2	44
House hits industry with strict Superfund bill	12-16	56
Tax reform future clouded by House vote	12-16	62
House approves tax reform measure	12-23	26

ORGANIZATIONS

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS (AAPG)

	Date	Page
AAPG president: Takeovers, taxes could extend downturn	3-18	51

AMERICAN GAS ASSOCIATION (AGA)

	Date	Page
AGA: Declining prices hold advantage for gas	1-21	34
AGA: Falling oil price means boost for gas sales	3-11	67
Ingaa, AGA assessing new FERC move	6-10	66
AGA: U.S. to hold edge in ammonia plant costs	8-12	51
AGA: Contract renegotiation needs FERC boost	9-16	74

AMERICAN PETROLEUM INSTITUTE (API)

	Date	Page
API chairman sounds warning on effect of Treasury's tax plan	2-4	29
API work group reports field tests of geothermal cements	2-11	93
API spells out loss in tax proposal	3-18	54
API group aims at operations in yearly meeting	3-25	67
Akins: OPEC output lid to buoy prices	4-15	32
API presses major changes in standardization program	4-15	33
API urges Interior to retain area-wide leasing	7-15	48
API study shows oil companies' high U.S. tax rate	9-16	76
Concern over tax reform, DOE gas plan highlight API meeting	11-25	25
API: EPA's Stage II vapor recovery program too costly	12-23	19

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA (IPAA)

	Date	Page
IPAA: Relax new BLM onshore drilling rules	1-28	81
Independents tackle tax, gas issues	6-10	78
IPAA pinpoints decline in U.S. drilling costs	6-10	82
IPAA: U.S. 1985 oil, gas demand to rise slightly	6-10	83
U.S. independent operators fear deadly blow from tax increase	11-4	41
IPAA sees slight gain in U.S. oil, gas demand	11-4	44
Forecasters see further slide for U.S. active rigs, rig fleet	11-4	46
Index shows drilling, completion cost decline	11-4	48

INDEPENDENT PETROLEUM ASSOCIATION OF CANADA (IPAC)

	Date	Page
IPAC: No accord likely on natural gas decontrol	9-16	73

INTERNATIONAL ASSOCIATION OF DRILLING CONTRACTORS (IADC)

	Date	Page
IADC tally shows decline in rotary rig fleet size	6-10	84

INTERSTATE NATURAL GAS ASSOCIATION OF AMERICA (Ingaa)

	Date	Page
Ingaa sees new era for gas pipelines	1-7	60
Ingaa tracks special gas marketing programs	2-25	62
Ingaa, AGA assessing new FERC move	6-10	66
Ingaa survey pinpoints renegotiated gas prices	8-26	44
Ingaa tally pinpoints increase in special marketing programs	9-23	62
Tough times seen for gas pipelines	9-30	32
Ingaa challenges FERC gas transportation rule	11-4	66

INTERSTATE OIL COMPACT COMMISSION (IOCC)

	Date	Page
IOCC: Tax plan would hit stripper operations	1-14	41
IOCC warns of more fallout from tax plan	1-21	50
IOCC: Treasury tax proposal would reduce EOR	2-4	29

NATIONAL PETROLEUM COUNCIL (NPC)

	Date	Page
NPC to study oil, gas supply/demand future	10-21	42

NATIONAL PETROLEUM REFINERS ASSOCIATION (NPRA)

	Date	Page
NPRA Q&A—1: Bigger role for catalysts in cat cracking	3-4	103
ANNUAL REFINING ISSUE: End-user computing highlighted at NPRA conference Q&A session	3-18	114
NPRA Q&A—2: Hydroprocessing catalysts see tough service	3-25	112
NPRA Q&A—3: Cat reformer catalyst problems NPRA topic	4-15	73
NPRA Q&A—4: Delayed coking operations examined	5-6	180

OFFSHORE TECHNOLOGY CONFERENCE (OTC)

	Date	Page
OTC shows industry can solve challenges of deepwater work	5-13	57

ORGANIZATION OF ARAB PETROLEUM EXPORTING COUNTRIES (Oapec)

	Date	Page
Big refining boosts set for Oapec countries—S. Akashah and A. M. Abushihada	6-17	101

ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES (OPEC)

	Date	Page
Markets reject OPEC price efforts—Roger Vielvoye	1-7	62
OPEC will tackle differentials again—Roger Vielvoye	1-14	37
Europe's chill eases price pressures on OPEC—Roger Vielvoye	1-21	49
OPEC price cuts draw mixed market response	2-4	31
Akins: OPEC output lid to buoy prices	4-15	32
Pirinc sees rebound in demand for OPEC oil	5-27	34
OPEC fails to act on output, prices—Roger Vielvoye	7-15	54
OECD oil use slips; slight non-Communist rebound seen	7-15	55
Comment: KPC: No threat from OPEC downstream move—Nader H. Sultan	7-15	57
OPEC orders slight cut in price of heavy crude—Roger Vielvoye	7-29	73
Saudis' refiner netback contracts push OPEC to brink of price war—Roger Vielvoye	9-23	41
OPEC fails to act on price, production—Roger Vielvoye	10-14	60
OPEC threat triggers crude price drop—Roger Vielvoye	12-16	61

WESTERN OIL & GAS ASSOCIATION (WOGA)

	Date	Page
West Coast government-industry accord seen	12-16	66

POINT OF VIEW

NAHAMA, RODNEY

	Date	Page
Cofounder, president, and chief executive officer of Nahama & Weagant Energy Co.—Bob Williams	4-1	161

CONTRIBUTING AUTHORS

A

AALUND, LEO R. (Journal Staff)

	Date	Page
New man on the beat	3-18	37
Cafe au lait	5-27	21
The third dimension	6-24	21
Sabine Pass sentinels	11-11	21

ABUSHIHADA, A. M. (Oapec); and AKASHAH, S. (Kuwait Institute of Scientific Research)

	Date	Page
Big refining boosts set for Oapec countries	6-17	101

ADAMS, NEAL (Adams & Rountree Technology Inc.)

	Date	Page
Three-step bit selection can trim drilling costs	6-17	118

ADEY, G. A. (British Pipeline Authority); and SHANNON, ERNEST, and JACKSON, LAWRENCE (British Gas Corp.)

	Date	Page
British Gas has seamless pipe inspection program	9-9	147

Date Page

AKASHAH, S. (Kuwait Institute of Scientific Research); and ABUSHIHADA, A. M. (Oapec)
Big refining boosts set for Oapec countries 6-17 101

ADKERSON, RICHARD C., VanSCHAFTEN, GARY F., and HECKER, JAMES A. (Arthur Andersen & Co.)
INDEPENDENT OPERATIONS REPORT: Perspective the key to raising capital from institutions 10-28 101

AKTEN, H. T., PAGE, R. T., and BINNS, K. A. (Fluor Ocean Services Ltd.); and LUND, S. (Statoil)
Cathodic protection, coatings protect Statpipe system 12-23 47

ALBJERG, A., MOYSE, B. M., and COOPER, B. H. (Haldor Topsoe Inc.)
Pore size of FCC pretreat catalyst important 3-11 111

AL-CHALABI, A. M., and SAMHOURI, F. A. (Abu Dhabi Co. for Onshore Oil Operations)
Khuff drilling—1: ADCO improves deep Khuff drilling 1-7 73
Khuff drilling—Conclusion: Program overcomes heat, pressure, sour gas 1-14 91

ALI, MOHAMMAD FARHAT, HASAN, MISBAH, BUKHARI, AHMED, and SALEEM, MOHAMMAD (University of Petroleum and Minerals)
Arabian crude-oil residues evaluated 8-12 71

ANDERSON, R. F., MOWRY, J. R., and JOHNSON, J. A. (UOP Inc.)
Process makes aromatics from LPG 12-2 128

ANDREASSON, HANS U., and UPSON, LAWRENCE L. (Katalistiks B.V.)
Four main FCC factors affect octane 8-5 91

ANEROUSIS, J. P., anJ DAVIS, B. J. (Physichem Technologies Inc.); and HANDLEY, D. D. (J. L. Davis Co.)
Iron sponge is economical and effective for NGL sweetening 9-23 122

ANEROUSIS, JOHN P., and WHITMAN, STEPHEN K. (Physichem Technologies Inc.)
Iron sponge: Still a top option for sour gas sweetening 2-18 71

ARMELLINI, TOBY J. (Armellini Engineering Inc.); and BAUGHN, MACK (Evergreen Energy Corp.)
High gas-liquids yield feature of small plant 1-7 78

ARNAUD, JEAN (NAT); and LOIRE, RENE (Tramco S.A.); and PAGEZY, MICHEL (BSFE); and PIASECKYJ, PETER J. (Duxbury Offshore Inc.)
OFFSHORE REPORT: Simplified production-mooring system developed 5-6 136

ARNOLD, CHARLES L. (Bechtel Petroleum Inc.)
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: Arctic waterflood pipelines in Prudhoe Bay injection project require protection analysis 6-24 89

ARNOLD, VICTOR E. (Badger Engineering Inc.)
MICROCOMPUTER REPORT: Microcomputer program converts ASTM, EFV distillation curves 2-11 55

ARONOFSKY, JULIUS S., COX, THOMAS F., and LANE, STEPHEN M. (Gaffney, Cline & Associates Inc.)
Reservoir simulation moves into third generation 11-4 75

ASIM, MEHMET Y., and DESAI, PANKAJ H. (Akzo Chemie America); and van HOUTERT, FRANS W., and NAT, PIETER J. (Akzo Chemie Nederland)
Mild hydrocracking of FCC feeds produces yield benefits in mid-distillates, gasoline 7-22 106

AVBOVBO, AKPO A. (Nigerian National Petroleum Corp.); and ICHARA, MARK J. (S. T. Schlumberger)
DRILLING TECHNOLOGY REPORT: Study identifies Niger Delta log parameter, VSP trends 3-4 94
How to handle abnormal pressures in Nigeria's Niger Delta area 3-11 122

B

BAKSHI, A. S. (Consultant)
MMA process shows economic promise 11-25 99

BANKS, R., and TOMLINSON, T. R. (Costain Petrocarbon Ltd.)
ANNUAL GAS PROCESSING REPORT: LPG extraction process cuts energy needs 7-15 81

BANNERMAN, WYBURN E., ZDYBAK, JAN M. L., and NEAL, JOHN A. (Georgia-Pacific Corp.)
Lignosulfonate copolymer stabilizes lime muds 3-25 116

BARENDREGT, S., and CRONIN, P. (Pyrotec); and PIERUCCI, S., DENTE, M., and RANZI, E. (Politecnico)
ETHYLENE REPORT: Coking simulation aids on-stream time 9-2 49

BARRY, DON W. (Shell Oil Co.)
Design of Cortez CO_2 system detailed 7-22 96

BARTHOLOMEW, K. D., YEPSON, G. L., and CULBERSON, S. F. (The Pace Co.)
ANNUAL REFINING ISSUE: Refiners mull no-lead options 3-18 108

BARTLETT, CHARLES S. JR. (Bartlett Energy Exploration Inc.)
Trenton limestone fracture reservoirs in Lee County, Southwest Virginia 6-10 164

BASSLER, E. J., PANO, B. V., and CHONG, E. S. (Stone & Webster Engineering Corp.)
Process integration can provide flexibility for lower olefins production 9-16 96

BATTARRA, VILLIAM, MAIRANI, OSCAR (Snamprogetti S.p.A.); and GENTILINI, MARCO (University of Bologna); and GIACCHETTA, GIANCARLO (University of Ancona)
Condensate-line correlations for calculating holdup, friction compared to field data 12-30 148

BAUGHN, MACK (Evergreen Energy Corp.); and ARMELLINI, TOBY J. (Armellini Engineering Inc.)
High gas-liquids yield feature of small plant 1-7 78

BAUMANN, HANS D. (H. D. Baumann Associates Ltd.)
CONTROL VALVE REPORT: New products appear even as valve industry restructures 12-16 73

BAUMANN, JOHN C. (Consultant)
Convenient flow-line equations derived for first approximation 10-7 111

BECK, ROBERT J. (Journal Staff)
Connections 1-28 53
FORECAST REVIEW: U.S. demand rebound to weaken in '85 1-28 87
Industry restructuring key factor in OGJ group's 1984 profits dip 4-1 41
Rules of forecasting 7-29 55
MIDYEAR FORECAST REVIEW: U.S. oil demand rise due in '85 after rebound in second half 7-29 89
Restructuring in second quarter key part of first-half profit slump 9-2 17
Stocks to play smaller role in meeting winter fuel demand 12-2 27
Nine-month OGJ group profits down 12-9 34
WORLDWIDE REPORT: Worldwide Production 12-30 70

BECK, ROBERT J., and OBEL, MICHAEL (Journal Staff)
World crude, condensate flow in '84 logs first increase since '79 3-11 41

BECK, ROBERT J., and SMITH, GLENDA E. (Journal Staff)
Restructuring helps take slice out of OGJ group earnings 5-20 25
Profits slide for OGJ group of firms 6-10 72

BELL, K., and CARD, J. W. (Carleton University); and DENHAM, G. M., and SHAH, S. R. A. (Alpha Nuclear Co.)
Radon decay product measurements in radiometric uranium exploration: implications for petroleum exploration 6-24 114

BELLAMY, GILLES, and JOUANNEAU, JEAN-FRANCOIS (Comex Services); and QUIN, RENE (Total Marine Norsk); and WIET, PAUL (Total Oil Marine)
Pipeline repair technique cuts downtime 2-11 101

BELLINGA, H., and KOOI, A. (N.V. Nederlandse Gasunie); and HOEKS, C. P. (Dutch Service of Legal Metrology); and van LAAK, F. A. L. (DMS); and ORBONS, P. J. (ARG)
ANNUAL PIPELINE REPORT: Piston prover used to calibrate gas meters 8-19 89

BENEFIELD, CURT S., and BROADWAY, ROBERT R. (Saber Refining Co.)
ANNUAL REFINING ISSUE: Refinery blends gasoline for the unleaded era 3-18 92

BERTAGNOLLI, RICHARD, and WATSON, STEVEN K. (Milchem Inc.)
Technique determines particle-size distribution in oil muds 3-18 146

BERZINS, WILLIAM E., HEWITT, KEVIN J., FITZPATRICK, JOHN P., and HOGEBOOM, HARRY G. (Canadian Marine Drilling Ltd.)
Canmar's berm-supported SSDC drilling advances arctic technology 7-1 39

BICKEL, S. H., and LUH, P. C. (Arco Oil & Gas)
Thin bed velocity resolution 4-8 126

BICKEL, S. H., and MAY, T. W. (ARCO)
ANNUAL GEOPHYSICAL REPORT: Seismic velocity—1: The effects of compaction on moveout 10-7 149
Seismic velocity—2: How compaction affects dipping beds 10-14 142

Date Page

BINNS, K. A., PAGE, R. T., and AKTEN, H. T. (Fluor Ocean Services Ltd.); and LUND, S. (Statoil)
Cathodic protection, coatings protect Statpipe system 12-23 47

BISHOP, W. F. (Tenneco Oil Exploration & Production)
Eocene and Upper Cretaceous carbonate reservoirs in East Central Tunisia 12-2 137

BLAIR, CHARLES M. JR., and STOUT, CHARLES A. (Magna Corp.)
Interfacial spreading agents increase waterflood production 5-20 55

BLANDFORD, JOSEPH W., GUTIERREZ, RICHARD, and McREE, ROBERT L. (Atlantia Engineering)
DRILLING TECHNOLOGY REPORT: Miniplatform accelerates production, saves expendable wells 3-4 76

BLAKE, BRUCE A. (Hunt Oil Co.)
Hand-held programmable calculator still proves useful in exploration 10-14 146

BLEAKLY, DOUGLAS, C., and VAN ALSTINE, DAVID R. (Z-Axis Exploration); and PACKER, DUANE R. (Consultant)
Core orientation—1: Controlling errors minimizes risk and cost in core orientation 12-2 103
Core orientation—conclusion: How to evaluate orientation data, quality control 12-9 46

BLURTON, KEITH F., SPILIOTIS, NICHOLAS J., and RIZZI, KENNETH W. (Kollmorgen Corp.)
Galling-resistant zinc silicon phosphate coating protects thread connections in hostile service 7-15 136

BORAI, A. M., and MUHSIN, M. A. (Abu Dhabi Marine Operating Co.)
LDT tool gives improved formation evaluation 7-8 60

BORTZ, LOUIS C. (Amoco Production Co.)
Hydrocarbons in the northern Basin and Range, Nevada and Utah 11-21 127

BOURDAIRE, JEAN MARIE, BYRAMJEE, RUSTUM JEAN, and PATTINSON, RONALD (Total)
Reserve assessment under uncertainty—a new approach 6-10 135

BOWMAN, GEORGE W. II, and MARSHALL, JOE F. JR. (Boffin Inc.)
MICROCOMPUTER REPORT: Decline curve software closes the gap 2-11 81

BRADFORD, B. B. (Dowell Schlumberger)
Attention to primary cementing practices leads to better jobs 10-21 59

BRADFORD, BEN, and REINERS, BOB (Dowell Schlumberger)
ANNUAL PRODUCTION ISSUE: Analysis gives successful cement squeeze 4-1 71

BRADLEY, BRYANT W. (C. C. Patton & Associates Inc.)
Oil-field water handling—1: Qualitative separation = theory + judgment 10-14 121
Oil-field water handling—2: Coalescers offer unique design features 11-18 136
Oil-field water handling—3: Flotation offers another water/oil separation alternative 12-9 42

BRADY, JACK D. (Andersen 2000 Inc.); and CREWS, JOHN S. (Unocal Corp.)
Waste heat exchanger increases efficiency, reduces cost 8-19 111

BRAMI, J. B., MUHAIYUDDIN, MOHD YUSOF, and RIEB, S. L. (Esso Production Malaysia Inc.)
History and geology of Malaysia's Tinggi field 2-18 127

BREWER, HERBERT L. (Triton Energy Corp.)
Improved economics prompt another look at France's Paris basin 1-7 105

BROADWAY, ROBERT R. and BENEFIELD, CURT S. (Saber Refining Co.)
ANNUAL REFINING ISSUE: Refinery blends gasoline for the unleaded era 3-18 92

BRULE, M. R. (Kerr-McGee Corp.); and KUMAR, K. H., and WATANASIRI, S. (University of Oklahoma)
Characterization methods improve phase-behavior predictions 2-11 87

BUKHARI, AHMED, HASAN, MISBAH, ALI, MOHAMMAD FARHAT, and SALEEM, MOHAMMAD (University of Petroleum and Minerals)
Arabian crude-oil residues evaluated [illegible] 31

BULL, M., HARPER, P. G., JARDINE, S. I., and TREHERNE, D. M. (Heriot-Watt University)
Microcomputer applications for control of novel acoustic direction sensing tool [illegible] [illegible]

BURGER, ROBERT (Burger Associates Inc.)
Cooling towers: neglected energy resource 4-15 53

BURGESS, I. R. (Canada Northwest Australia Oil N.L.)
Carpentaria basin: a regional analysis 7-29 180

BURKHOLDER, LARRY (Pfizer Corp.)
Xanthan gel system effective for profile modification 4-15 68

BURNS, PATRICK J. (P. J. Burns & Associates); and CLAUS, ROBERT C. (Consultant)
An overview of hydrocarbon production in Appalachian basin—a glance at the forest 8-12 116

BURT, BARRY, and DEHAM, LES (Seiscom Delta United); and DURRANI, JAVAID (Conoco Inc.)
ANNUAL GEOPHYSICAL REPORT: Conducting a large 3D land survey in a densely populated area—an East Texas case history 10-7 77

BURTON, JIM (Exxon Chemical Co.); and FORD, TOM (Exxon Research & Engineering Co.)
Evaluating mineral oils for low-toxicity muds 7-29 129

BUSH, NICHOLAS J. (Natural Gas Supply Association)
Comment: Contract sanctity, regulations top concerns of gas producers 10-28 66

BYESEDA, J. J., DEETZ, J. A., and MANNING, W. P. (C-E Natco, Combustion Engineering Inc.)
New gas-sweetening solvent proves successful in four field trials 6-10 144

BYRAMJEE, RUSTUM JEAN, BOURDAIRE, JEAN MARIE, and PATTINSON, RONALD (Total)
Reserve assessment under uncertainty—a new approach 6-10 135

C

CALDWELL, ROBERT H., and JOHNSTON, DANIEL (Scotia Energy Inc.)
Drilling statistics influence most-appropriate risk technique 12-30 136

CAMPAGNA, ROBERT J., HUMPHRIES, ADRIAN P., DEMMEL, EDWARD J., and YANIK, STEPHEN J. (Harshaw/Filtrol Partnership)
FCC catalysts containing shape-selective zeolites boost gasoline octane number and yield 5-13 108

CAMPBELL, JAMES E., PAHWA, SURESH B., MacDONALD, ROBERT C., and STATHAM, WILLIAM H. (Intera Technologies Inc.)
MICROCOMPUTER REPORT: Microcomputers aid investment decisions 2-11 63

CANNON, RON (Gas Processors Association)
ANNUAL GAS PROCESSING REPORT: Gas processors' production up, margins down 7-15 77

CANTRELL, AILLEEN (Journal Staff)
ANNUAL REFINING ISSUE: Annual refining survey 3-18 122
WORLDWIDE CONSTRUCTION REPORT: Refineries 4-22 96
WORLDWIDE CONSTRUCTION REPORT: Petrochemicals 4-22 104
WORLDWIDE CONSTRUCTION REPORT: Sulfur 4-22 114
WORLDWIDE CONSTRUCTION REPORT: Gas Processing 4-22 117
WORLDWIDE CONSTRUCTION REPORT: Related Fuels 4-22 119
WORLDWIDE CONSTRUCTION REPORT: Pipelining 4-22 120
ANNUAL GAS PROCESSING REPORT: Worldwide gas processing survey 7-15 90
Worldwide sulfur derived from oil and gas 9-16 117
WORLDWIDE CONSTRUCTION REPORT: Refineries 10-21 85
WORLDWIDE CONSTRUCTION REPORT: Petrochemicals 10-21 92
WORLDWIDE CONSTRUCTION REPORT: Sulfur 10-21 100
WORLDWIDE CONSTRUCTION REPORT: Gas Processing 10-21 101
WORLDWIDE CONSTRUCTION REPORT: Related Fuels 10-21 103
WORLDWIDE CONSTRUCTION REPORT: Pipelining 10-21 104
WORLDWIDE REPORT: Survey of operating refineries worldwide 12-30 100
WORLDWIDE REPORT: Worldwide refining 12-30 102

CARD, J. W., and BELL, K. (Carleton University); and DENHAM, G. M., and SHAH, S. R. A. (Alpha Nuclear Co.)
Radon decay product measurements in radiometric uranium exploration: implications for petroleum exploration 6-24 114

CARLIN, FRANK, and SAUNDERS, DONNA (Baker Tubular Services)
Two-joint thread redesign cuts stress, increases fatigue life 7-22 75

CARVALHO, FRANCISCO F. (International Group of Consultants), and DUMESTRE, MICHEL A. (Consultant)
The petroleum geology of the Republic of Guinea-Bissau 4-4 140

	Date	Page
CASE, JAMES L., RYAN, BERNARD F., and JOHNSON, JOHN E. (Stearns Catalytic Corp.)		
CO_2-rich mixtures—1: CO_2 streams pose new design considerations	5-6	175
CO_2-rich mixtures—2: Water in high-CO_2 stream complicates design factors	5-13	103
CASTRO, AUGUSTO CANELLAS M. JR., SCHALLER, HANNFRIED, DAUZACKER, MODESTO VICTOR, and de SOUZA, MURILO MARROQUIM (Petrobras)		
Geology of Brazil's Atlantic margin basins	3-4	142
CAWKWELL, M. G., and CHARLES, M. E. (University of Toronto)		
Pressures, temperatures predicted for two-phase pipelines	5-27	101
CHABOT, LUC (Ocean Drilling & Exploration)		
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: Odeco designs massive deepwater Arctic rig	6-24	59
CHAPEL, D. G., and COBB, D. D. (Fluor Engineers Inc.)		
Idle catalytic reformer can be converted to isomerization unit or jet-fuel treater	6-3	60
CHARBONNEAU, ARTHUR (Movats Inc.)		
CONTROL VALVE REPORT: Test system spots MOV degradation	12-16	102
CHARLES, M. E., and CAWKWELL, M. G. (University of Toronto)		
Pressures, temperatures predicted for two-phase pipelines	5-27	101
CHEN, H. C., GIBSON, K. R., HUNG, C., and HOWELL, R. L. (Chevron Research Co.)		
Catalyst selection important for residuum hydroprocessing	7-29	121
CHEN, HENRY (Brown & Caldwell Consulting Engineering)		
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: Computer program uses simulation method to help manage weather-sensitive projects	6-24	80
CHENG, AARON M. C. (Dresser Industries Inc.)		
Perforating damage and shot density analyzed	3-4	112
CHENOWETH, PHILIP A. (Consulting Geologist)		
Hydrocarbon distribution: Ouachita overthrust belt	7-22	122
CHONG, E. S., PANO, B. V., and BASSLER, E. J. (Stone & Webster Engineering Corp.)		
Process integration can provide flexibility for lower olefins production	9-16	96
CHRISTENSEN, MIKE L. (Gulf Oil E&P Co.); and TOMPKINS, BILL G. (NRG Systems Engineers)		
OFFSHORE REPORT: Offshore instrument/control systems evaluated	5-6	166
CLAUS, ROBERT C. (Consultant); and BURNS, PATRICK J. (P. J. Burns & Associates)		
An overview of hydrocarbon production in Appalachian basin—a glance at the forest	3-11	116
CLEM, K. R., WATSON, E. A., SCHICHO, C. M., and HARTLEY, D. (Exxon Research & Engineering Co.)		
System for degassing liquid sulfur can reduce total hydrogen sulfide to acceptable levels	12-9	56
CLEM, KEITH (Utah Geological & Mineral Survey)		
Petroleum geology of the greater Altamont area, Uinta basin, Utah	5-20	87
CLEMENT, C. C., MANESS, S. F., and MASON, C. M. (Sohio Petroleum Co.)		
Sohio task group finds better completion techniques for Anadarko basin gas wells	8-26	71
COBB, D. D., and CHAPEL, D. G. (Fluor Engineers Inc.)		
Idle catalytic reformer can be converted to isomerization unit or jet-fuel treater	6-3	60
COHEN, LAURENCE H., and MULLER, HERMAN L. (Amoco Oil Co.)		
Methanol cannot economically dislodge gasoline	1-28	119
CONCEICAO, JOAO, LANA, MARCOS, MILANI, EDSON, SZATMARI, PETER, and LOBO, ANTONIO (Petrobras Research Center)		
How South Atlantic rifting affects Brazilian oil reserves distribution	1-14	107
CONRARD, M. C., CREMER, G., KOENIG, J. W. J., OPITZ, H. M., QUEME, J. P., SIBRA, P., SOBEL, R. TH., VLEMMINGS, J. M. L. M., and WALLER, G. J. (Concawe)		
Major study reveals EEC gas oil desulfurization costs	1-21	55
COOPER, B. H., ALBJERG, A., and MOYSE, B. M. (Haldor Topsoe Inc.)		
Pore size of FCC pretreat catalyst important	3-11	110
COPLEY, KELLY (Cameron Iron Works)		
New elastomer developed specifically for arctic wellheads	7-1	60
CORBETT, RICHARD A. (Journal Staff)		
An energy-efficient refrigeration system developed for natural gas liquids recovery	1-21	74
ANNUAL REFINING ISSUE: U.S. refining capacity resumes decline	3-18	89
Guide to export crudes for the '80s: Two high-quality offshore crude oils, Sharjah Condensate and Maragham Light, are assayed	7-8	54
Flare-system operating costs can be reduced	9-23	136
Refiners' supermarket	10-14	59
WORLDWIDE CATALYST REPORT: Major increase in new catalysts logged	10-14	73
More refining catalysts available	11-18	127
CONTROL VALVE REPORT: New control valve improves operating characteristics	12-16	90
CORMIER, W. E., MAGEE, J. S., and WOLTERMANN, G. M. (Katalistics Inc.)		
REFINING TECHNOLOGY REPORT: Octane catalysts contain special sieves	5-27	58
COSTER, PETER, and LAWRENCE, STEVE (Exploration Consultants Ltd.)		
Petroleum potential of Offshore Guyana	12-9	67
COULL, THOMAS B., and McGILLIVRAY, TERRENCE L. (PMB Systems Engineering Inc.)		
OFFSHORE REPORT: Compliant jacket challenges deep water with new design	5-6	112
COURCELLE, J.C., and MAULEON, J. L. (Total-France)		
FCC heat balance critical for heavy fuels	10-21	64
COWARD, ROBERT S., and SKARET, WARREN M. (Canterra Energy Ltd.)		
Sulfur recovery mixed in Claus/Sulfreen units at Ram River	4-8	86
COX, THOMAS, F., ARONOFSKY, JULIUS S., and LANE, STEPHEN M. (Gaffney, Cline & Associates Inc.)		
Reservoir simulation moves into third generation	11-4	75
CRAIG, BRUCE (Metallurgical Consultants Inc.)		
Critical velocity examined for effects of erosion-corrosion	5-27	99
CRAYSTON, GEORGE W., and PHILPOT, P. A. (Shell U.K. Ltd.)		
Three gathering networks comprise northern North Sea gas system	8-12	84
CREMER, G., KOENIG, J. W. J., OPITZ, H. M., QUEME, J. P., SIBRA, P., SOBEL, R. TH., VLEMMINGS, J. M. L. M., WALLER, G. J., and CONRARD, M. C. (Concawe)		
Major study reveals EEC gas oil desulfurization costs	1-21	55
CRENSHAW, PAUL L. (Western Co. of North America)		
How to avoid myths of squeeze cementing	4-22	93
CREWS, JOHN S. (Unocal Corp.); and BRADY, JACK D. (Andersen 2000 Inc.)		
Waste heat exchanger increases efficiency, reduces cost	8-19	121
CRONIN, P., and BARENDREGT, S. (Pyrotec); and PIERUCCI, S., DENTE, M., and RANZI, E. (Politecnico)		
ETHYLENE REPORT: Coking simulation aids on-stream time	9-2	49
CROW, PATRICK (Journal Staff)		
The Reagan agenda	1-7	51
Reshuffling Energy	1-14	53
Battling Treasury	1-21	42
Winding down ERA	1-28	73
Tax "simplification" tops list of energy issues in 99th Congress	2-4	25
McClure's outlook	2-4	35
A warning on imports	2-11	37
Another look at gas	2-18	53
Quotas and tariffs	2-25	56
Exploring fallout	3-4	67
Complexity of [illegible]	3-11	54
More about [illegible]	3-18	67
More trouble for [illegible]	3-25	67
Tax reform's next show	4-1	52
More takeover debate	4-8	58
Revenue sharing	4-15	38
[illegible] import solution	4-22	67
A view of the future	4-29	73
Environmental shift	5-6	44
Reformed tax reform	5-13	40
Certainty on OCS lands	5-20	51
[illegible]	5-27	[illegible]

	Date	Page
Great Plains' problems	5-27	36
Oil takes due close look as Congress mulls reform plans	6-3	25
OCS numbers game	6-3	48
Leveling the field	6-10	59
A last hurrah?	6-17	66
Treasury II pro and con	6-24	41
Congress in no hurry to decontrol more wellhead prices	7-1	20
Focus on OCS issues	7-1	29
Rewriting safety rules	7-8	31
Hodel's goal: certainty in leasing policies and schedules	7-15	41
A thumbs down from Eck	7-15	64
Area-wide sale success	7-22	65
Funds for SFC	7-29	75
No F-double-E	8-5	40
Quotes on oil and gas	8-12	46
OSHA II	8-19	46
Constant change	8-26	50
Congress eyes superfund extension	9-2	34
Cutting gasoline volatility	9-2	37
Congressional agenda	9-9	77
Hodel's California OCS deal tumbles	9-16	68
Tax reform outlook	9-16	73
More on Hodel's deal	9-23	55
The block billing issue	9-30	55
SFC subterfuge	10-7	59
More on tax reform	10-14	50
Broadsides over synfuels	10-21	30
Taxing pipelines	10-28	61
Tax reform showdown	11-4	51
Cutting SFC funds	11-11	50
Fallout from Juan	11-18	85
Agreement on taxes	11-25	51
Moratorium issues	12-2	50
Tax reform doubts	12-9	39
Gas decontrol revisited	12-16	67
A move to kill SFC	12-23	37
Win for the Gipper	12-30	59

CULBERSON, S. F., YEPSON, G. L., and BARTHOLOMEW, K. D. (The Pace Co.)
ANNUAL REFINING ISSUE: Refiners must increase [illegible] 3-18 128

CUMBERLIDGE, J. T., and McCULLOUGH, W. D. (Hanna Petroleum Co.)
Economic profile of Ohio's Clinton sand 3-11 91

CUNIC, J. D., and HARTLEY, D. (Exxon Research & Engineering Co.)
FCCU flue-gas scrubber experience updated 11-18 154

CURTIS, M. I., and HUXLEY, D. B. (Sohio Petroleum Co.)
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: First Arctic offshore field, Endicott, on decade-long way to production [illegible] 64

D

DABLAIN, M. A., and LINVILLE, A. F. (Mobil Research & Development Corp.)
Case study in seismic diffraction near a gulf coast salt dome 10-14 137

DALODE, JAQUES (Saga Petroleum Benin); and ELVSBORG, ARVID (Saga Petroleum)
Benin hydrocarbon potential looks promising 2-11 126

DALY, THOMAS E. (REMI Inc.); and ROBINSON, EDWARD (Consultant); and DESPRETZ, JEAN-MARIE (Petrofina)
Saba Bank petroleum geology, NE Caribbean 11-4 112

DAR, VINOD K. (Hadson Gas Systems Inc.)
Comment: Resolve conflicting interests to improve U.S. gas industry [illegible] 34

DARR, K. MICHELE (Marathon Oil Co.); and FULTON, THOMAS K. (Gulf Oil Exploration & Production Co.)
Offset panel: A powerful analytical tool [illegible] 134

DAUZACKER, MODESTO VICTOR, SCHALLER, HANNFRIED, CASTRO, AUGUSTO CANELLAS M. JR., and de SOUZA, MURILO MARROQUIM (Petrobras)
Geology of Brazil's Atlantic margin basins 3-4 142

DAVIDSON, WILLIAM F., and ERICKSON, DONALD C. (Energy Concepts Co.)
[illegible] energy savings [illegible]

DAVIET, G. R., and HIRCOCK, N. C. (Dome Petroleum Ltd.)
Improving [illegible]

DAVIS, B. J., and ANEROUSIS, J. P. (Physichem Technologies Inc.); and HANDLEY, O. D. (J. L. Davis Co.)
Iron sponge is economical and effective for NGL sweetening 9-23 122

DAVIS, G. W. (Ecological Engineering Systems Inc.)
First U.S. Sulfreen unit in Dakota gas plant 2-25 108

DAVIS, GARY D. (Unocal Corp.)
Operating experience confirms draft controller value 9-30 55

DAVIS, R., and DAMMILLER, R. (Conoco Inc.); and HEGARTY, W. P. (Air Products & Chemicals Inc.); and GOAR, B. GENE (Goar, Arrington & Associates Inc.)
Claus plant capacity boosted by oxygen-enrichment process 9-30 39

DEAN, P. D., and MURPHY, R. E. (Northwest Pipeline Co.); and GORDON, EDWARD (Fluor Engineers Inc.)
Leak, rupture detection can be improved 11-4 84

de BOISBLANC, C. W. (Pete) (Am-Pet Services Inc.)
Water mud gives advantages with PCD bits 4-1 134

DEETZ, J. A., BYESEDA, J. J., and MANNING, W. P. (C-E Natco, Combustion Engineering Inc.)
New gas-sweetening solvent proves successful in four field trials 6-10 144

DELANEY, PATRICK J. V. (Geo-Informacoes Ltda.); and PEES, SAMUEL T. (Consulting Geologist)
Oil, gas potential of Brazil's Pelotas basin 2-18 117

DELOS, JEAN-PIERRE (Total Exploration Production Cameroon)
OFFSHORE REPORT: Gelled oil gravel pack improves well flow 5-6 125

DEMMEL, EDWARD J., YANIK, STEPHEN J., HUMPHRIES, ADRIAN P., and CAMPAGNA, ROBERT J. (Harshaw Filtrol Partnership)
FCC catalysts containing shape-selective zeolites boost gasoline octane number and yield 5-13 108

DeNERO, HENRY T., and MAHINI, AMIR (McKinsey & Co. Inc.)
How to meet overseas content laws 2-4 68

DENHAM, G. M., and SHAH, S. R. A. (Alpha Nuclear Co.); and CARD, J. W., and BELL, K. (Carleton University)
Radon decay product measurements in radiometric uranium exploration: implications for petroleum exploration 6-24 114

DENHAM, LES, and BURT, BARRY (Seiscom Delta United); and DURRANI, JAVAID (Conoco Inc.)
ANNUAL GEOPHYSICAL REPORT: Conducting a large 3D land survey in a densely populated area—an East Texas case history 10-7 77

DENTE, M., RANZI, E., and PIERUCCI, S. (Politecnico); and BARENDREGT, S., and CRONIN, P. (Pyrotec)
ETHYLENE REPORT: Coking simulation aids on-stream time 9-2 49

DENTON, ROBERT D. (Exxon Production Research Co.); and RULE, D. D. (Exxon Exploration & Production)
Two combined cryogenic processes cut sour natural-gas processing cost 8-19 120

DESAI, PANKAJ H., ASIM, MEHMET Y. (Akzo Chemie America); and van HOUTERT, FRANS W., and NAT, PIETER J. (Akzo Chemie Nederland)
Mild hydrocracking of FCC feeds produces yield benefits in mid-distillates, gasoline 7-22 106

de SOUZA, MURILO MARROQUIM, CASTRO, AUGUSTO CANELLAS M. JR., SCHALLER, HANNFRIED, and DAUZACKER, MODESTO VICTOR (Petrobras)
Geology of Brazil's Atlantic margin basins 3-4 142

DESPRETZ, JEAN-MARIE (Petrofina); and DALY, THOMAS E. (REMI Inc.); and ROBINSON, EDWARD (Consultant)
Saba Bank petroleum geology, NE Caribbean 11-4 112

DiBOHA, CHARLES J. (American Petroleum Institute)
Comment: Policy proposals demonstrate wrong moves on U.S. oil, gas 12-30 50

DIEHL, GARY E. (Union Carbide Industrial Services Co.); and SMITHWICK, PAUL L. (Chevron U.S.A.)
Tax saving speeds reformer start-up after regeneration 11-25 104

DILLON, K., KHAN, A. U., and STRIPLING, T. E. (Brown & Root)
Hydraulic analysis aids high-pressure system design [illegible] 125

DISHROON, C. P., KINGSTON, D. R., and WILLIAMS, P. A. (Esso Exploration Inc.)
A hydrocarbon habitat [illegible] 136
[illegible] 139
[illegible] 142

Date Page

DONNELLY, S. T. (Propak Systems Inc.); and MacKENZIE, D. H. (Propak Systems Ltd.)
Mixed refrigerants proven efficient in natural-gas-liquids recovery process 3-4 116

DORSEY, DAVE, and VENUS, TOM (Mayco Wellchem)
Drilling cement with a polymer mud 4-1 128

DOWNING, JUDITH C., GOODBOY, KENNETH P., and FLEMING, HUBERT L. (Alcoa)
Sulfur and carbon deposition on Claus catalysts examined 11-4 89

DRAKE, ELIZABETH (Journal Staff)
Wonderland revisited 12-16 77

DRAKE, ELIZABETH, and PETZET, G. ALAN (Journal Staff)
Reduced prices spark purchases of oil and gas reserves in U.S. 10-14 43

DUMESTRE, M. A. (Altantic Resources Ltd.)
OFFSHORE REPORT: Northern Gulf of Guinea shows promise 5-6 154
The petroleum geology of Senegal 10-28 146

DUMESTRE, MICHEL A. (Consultant); and CARVALHO, FRANCISCO F. (International Group of Consultants)
The petroleum geology of the Republic of Guinea-Bissau 4-4 160

DUNLAP, LARRY, and THOMPSON, D. R. (NL Baroid)
Computer system controls mud during kick kill 11-25 90

DURKEE, E. F. (Worldwide Exploration Consultants Inc.); and STEWART, W. D. (Geological Survey of Papua New Guinea)
Petroleum potential of the Papuan basin 4-1 151

DURRANI, JAVAID (Conoco Inc.); and DENHAM, LES, and BURT, BARRY (Seiscom Delta United)
ANNUAL GEOPHYSICAL REPORT: Conducting a large 3D land survey in a densely populated area—an East Texas case history 10-7 77

DURRETT, LARRY R. (W. K. Technology Inc.); and MATTY, JANE M., and TOMSON, MASON B. (Rice University); and ROGERS, LEO A. (Gas Research Institute)
ANNUAL PRODUCTION ISSUE: Saturation index predicts brine's scale-forming tendency 4-1 81

E

EGERTSON, DARRELL J. (Apache Corp.)
INDEPENDENT OPERATIONS REPORT: Master limited partnerships help companies attract capital 11-25 92

EIBER, ROBERT J., and WILLIAMS, DEAN N. (Battelle Columbus Laboratories)
Test measures ERW line pipe weld ductility 4-8 96

EINARSSON, T. D., GILBERT, G. M., McBEATH, R. G., and SANDERS, J. I. (Geophysical Service Inc.)
ANNUAL GEOPHYSICAL REPORT: 3D marine systems—an exploration tool 10-7 84

EISENHARDT, WILLIAM C., and HOLZMAN, HARRY T. (Geomap Co.)
Exploration and development—Gulf Coast Tertiary, 1983 7-8 68

EL-FEKY, SAMY A., and OSMAN, MOHAMMED E. (University of United Arab Emirates)
Design methods for two-phase pipelines compared, evaluated 9-2 57

ELIASSON, MAX (Sydkraft AF); and MOLIN, JAN, and JANSON, JAN ERIK (VBB AB)
Oresund submarine pipeline: Sweden's access to North Sea gas [illegible] [illegible]

ELLINGTON, REX T., HILL, M. J., and SAVIDGE, J. L. (University of Oklahoma)
On-line compressibility factors can improve metering by minimizing measurement error 9-2 [illegible]

ELVSBORG, ARVID (Saga Petroleum); and DALODE, JAQUES (Saga Petroleum Benin)
Benin hydrocarbon potential looks promising [illegible] [illegible]

ERICKSON, DONALD C., and DAVIDSON, WILLIAM F. (Energy Concepts Co.)
AHP gives NGL fractionation energy savings [illegible] [illegible]

EVANS, DAVID (National Bureau of Standards); and PFENNING, DWIGHT (Energy Analysts Inc.)
Water sprays suppress gas well blowout fires 4-29 [illegible]

EWING, T. E., GARRETT, C. M. JR., GALLOWAY, W. E., and TYLER, NOEL (University of Texas)
Oil accumulation, production characteristics: targets for added recovery in Texas reservoirs—1 2-25 123
Oil accumulation, production characteristics: targets for added recovery in Texas reservoirs—2 3-4 133

F

FABECK, PIERRE H. (ACEC Belgium); and ROSS, ROBERT R. (United Centrifugal Pumps)
Flexible inducer pumps can have wide operating range 8-5 96

FADEL, T. M. (Abu Dhabi Gas Liquefaction Co.)
Program predicts pressure drops for single-phase fluids flowing in pipes, fittings 1-21 61

FARRAR, G. L. (Consultant)
Nelson Cost Index 1-7 86
Quarterly costimating: How indexes have risen 1-7 98
Nelson Cost Index 2-4 67
Nelson Cost Index 3-4 120
Nelson Cost Index 4-1 115
Quarterly costimating: How indexes have risen 4-1 116
Nelson Cost Index 5-6 204
Nelson Cost Index 6-3 77
Quarterly costimating: How indexes have risen 7-1 48
Nelson Cost Index 7-1 55
Nelson Cost Index 8-5 102
Nelson Cost Index 9-2 76
Quarterly costimating: How indexes have risen 10-7 114
Nelson Cost Index 10-7 142
Nelson Cost Index 11-4 98
Nelson Cost Index 12-2 115
How Nelson cost indexes are compiled 12-30 145

FEDER, ALLEN M. (Western Geophysical Co. of America)
Contemporary remote sensing for hydrocarbon exploration, development—with case histories 9-23 160

FEENSTRA, RUBIN (Shell Research B.V.)
Diamonds are becoming more important to drilling technology 12-30 131

FERTL, WALTER H. (Dresser Industries)
Logs help approximate reservoir temperature 4-29 89

FISHER, I. P., and JOHNSON, A. (Gulf Canada Ltd.)
Bag sampling aids FCCU studies 2-11 98

FISK, LANNY H. (Loma Linda University); and FRITTS, STEVEN G. (Barrick Exploration Co.)
The Columbia basin—1: Tectonic model for formation of Columbia basin: implications for oil, gas potential of North Central Oregon 8-26 84
The Columbia basin—2: Structural evolution of south margin, relation to hydrocarbon generation 9-2 85

FITZPATRICK, JOHN P., BERZINS, WILLIAM E., HEWITT, KEVIN J., and HOGEBOOM, HARRY G. (Canadian Marine Drilling Ltd.)
Canmar's berm-supported SSDC drilling advances arctic technology [illegible] 89

FLEMING, HUBERT L., DOWNING, JUDITH C., and GOODBOY, KENNETH P. (Alcoa)
Sulfur and carbon deposition on Claus catalysts examined 11-4 89

FLETT, TABE O., MARTIN, GARY C., TURNER, RONALD F., and STEFFY, DAVID A. (U.S. Geological Survey)
Evolution and petroleum geology of the Navarin basin, Bering Sea, Alaska 8-5 116

FLOWERS, ROB (Saecon)
Calculator program trilogy characterizes commingled gas streams 8-26 60

FOGARASI, MARIA (University of Calgary); and GREGORY, GARRY A. (Neotechnology Consultants Ltd.)
Alternate to standard friction factor equation 4-1 [illegible]

FOLKS, R. L. (Conoco Inc.)
[illegible] [illegible] [illegible]

FONTAINE, DAVID A. (Consulting Geologist)
Mapping techniques that [illegible] [illegible] [illegible]

FORD, TOM (Exxon Research & Engineering Co.); and BURTON, JIM (Exxon Chemical Co.)
Evaluating [illegible] [illegible] [illegible]

Date Page

FORTE, THOMAS C., and KIEFNER, JOHN F. (Battelle Columbus Laboratories)
Hydrostatic retesting—1: Model predicts hydrostatic retest intervals 1-7 33
Hydrostatic retesting—Conclusion: Model shows value of wide pressure margins 1-14 83

FOWLER, JOE R. (Stress Engineering Services Inc.); and VALKA, WILLIAM A. (FMC Corp.)
DEEPWATER TECHNOLOGY REPORT: Loads forces considered for deepwater wellheads 12-2 77

FRASER, LINDSAY (IMCO Services)
KOH lignosulfonate mud controls Laffan, Nahr Umr, Wasia shales off Abu Dhabi 10-14 134

FRITTS, STEVEN G. (Barrick Exploration Co.); and FISK, LANNY H. (Loma Linda University)
The Columbia basin—1: Tectonic model for formation of Columbia basin: implications for oil, gas potential of North Central Oregon 8-26 84
The Columbia basin—2: Structural evolution of south margin, relation to hydrocarbon generation 9-2 85

FULTON, THOMAS K. (Gulf Oil Exploration & Production Co.); and DARR, MICHELE, K. (Marathon Oil Co.)
Offset panel: A powerful analytical tool 5-14 131

G

GALE, WILLIAM E. (Bechtel Inc.)
Module ventilation rates quantified 11-23 94

GALLOWAY, W. E., TYLER, NOEL, GARRETT, C. M. Jr., and EWING, T. E. (University of Texas)
Oil accumulation, production characteristics, targets for added recovery in Texas reservoirs—1 2-25 117
Oil accumulation, production characteristics, targets for added recovery in Texas reservoirs—2 3-4 131

GANAPATHY, V. (ABCO Industries)
Heat transfer, insulation calculations simplified 6-18 127
Heat-recovery boiler design for cogeneration, process applications covers many parameters 12-2 124

GARDNER, GEORGE R., SANDY, JOE, and RINGHISEN, JOHN A. (Halliburton Services)
Completion strategy includes clay and precipitate control 3-4 130

GARDNER, RAY (Norchem Division of Northern Petrochemicals)
ANNUAL PETROCHEMICAL ISSUE: Temperature monitoring system saves [illegible] in under a year 3-25 [illegible]

GARDNER, WILLIAM J. (Caterpillar Tractor Co.)
ARCTIC DRILLING DEVELOPMENT TECHNOLOGY REPORT: Operating tips boost arctic diesel efficiency 6-24 111

GARRETT, C. M. JR, EWING, T. E., GALLOWAY, W. E., and TYLER, NOEL (University of Texas)
Oil accumulation, production characteristics, targets for added recovery in Texas reservoirs—1 2-25 117
Oil accumulation, production characteristics, targets for added recovery in Texas reservoirs—2 3-4 131

GDANSKI, RICK (Halliburton Services)
AlCl₃ retards HF acid for more effective stimulations 10-28 111

GEIST, JACOB M. (Geist Tec)
Refrigeration cycles for future base-load LNG plants need a close look 3-4 76

GENTILINI, MARCO (University of Bologna), and BATTARRA, VILLIAM, and MARIANI, OSCAR (Snamprogetti S.p.A.); and GIACCHETTA, GIANCARLO (University of Ancona)
Condensate line correlations for calculating holdup, friction compared to field data 12-30 144

GERSHUNOV, EUGENE M. (Santa Fe Braun)
Induced offshore hydrodynamic force calculated [illegible] 41
Calculating the decreasing load on offshore structure modeled by a [illegible] field [illegible] [illegible]

GIACCHETTA, GIANCARLO (University of Ancona); and GENTILINI, MARCO (University of Bologna); and BATTARRA, VILLIAM, and MARIANI, OSCAR (Snamprogetti S.p.A.)
Condensate line correlations for calculating holdup, friction compared to field data 12-30 144

GIBSON, K. R., HUNG, C., HOWELL, R. L., and CHEN, H. C. (Chevron Research Co.)
Catalyst selection important for residuum hydroprocessing 7-29 121

GILBERT, G. M., EINARSSON, T. D., McBEATH, R. G., and SANDERS, J. I. (Geophysical Service Inc.)
ANNUAL GEOPHYSICAL REPORT: 3D marine systems—an exploration tool 10-7 84

GLASGOW, P. E. (M. W. Kellogg Co.)
FCCU revamp allows higher temperature operation 4-29 171

GOAR, B. GENE (Goar, Arrington & Associates Inc.); and HEGARTY, W. P. (Air Products & Chemicals Inc.); and DAVIS, R., and KAMMILLER, R. (Conoco Inc.)
Claus plant capacity boosted by oxygen-enrichment process 9-30 39

GOFF, JOHN (Mobil Oil Corp.)
Concession terms affect crude oil profitability 7-29 176

GOKSEM, P. G. (Oil Industry Services A/S); and PATEL, I. D. (Agder Distriktshogskole)
Program gives design data for multiple-line flow system to avoid cavitation 4-15 156

GOLDZBERG, V., and McKEE, F. (Delta-X Corp.)
ANNUAL PIPELINE REPORT: Model predicts liquid accumulation, severe terrain-induced slugging for two-phase lines 8-19 105

GONZALEZ, RICHARD J. (University of Texas at Austin)
Comment: Tax reform must recognize essential role of [illegible] energy 1-[illegible] 52

GOOD, JAMES C. (Houston Pipe Line Co.)
ANNUAL PIPELINE REPORT: Texoma conversion aims at system safety 8-19 77

GOODBOY, KENNETH P. (Alcoa)
Catalyst increases COS conversion 7-28 88

GOODBOY, KENNETH P., DOWNING, JUDITH C., and FLEMING, HUBERT L. (Alcoa)
Sulfur and carbon deposition on Claus catalysts examined 11-4 89

GORDON, EDWARD (Fluor Engineers Inc.); and MURPHY, R. E., and DEAN, P. D. (Northwest Pipeline Co.)
Leak, rupture detection can be improved 11-4 84

GRACE, ROBERT D. (Grace, Shursen, Moore & Associates)
Case history of Texas' largest blowout shows successful techniques on deepest relief well 5-20 68

GRAF, KENNETH (Norton Co.)
Correlations for design, evaluation of packed vacuum towers 5-20 60

GRAVES, KYLE S. (Zapata Off-Shore Co.)
Planning would boost liner-cementing success 4-15 47

GREGORY, GARRY A. (Neotechnology Consultants Ltd.); and FOGARASI, MARIA (University of Calgary)
A remedy to standard friction factor equation 4-1 120

GRESHAM, WILLIAM J. (National Supply Co.)
Model for U.S. drilling efficiency aids forecasts 4-8 67

GRIES, ROBBIE RICE (Petroleum Geologist)
San Juan sag: Cretaceous rocks in volcanic-covered basin, South Central Colo. 11-28 109

GUIDRY, TOM (Mobil Oil Corp.)
Cycle production system cuts drilling costs 9-9 151

GUIEZE, PAUL, WILLIAMS, JOHN MICHAEL, and VAROTSIS, NIKOS (Flopetrol-Johnston)
Equations determine basis of PVT curves 10-21 79

GUTIERREZ, RICHARD, McREE, ROBERT L., and BLANDFORD, JOSEPH W. (Atlantia Engineering)
DRILLING TECHNOLOGY REPORT: Mini-platform economically [illegible] 3-4 76

H

HAGAR, RICK (Journal Staff)
[illegible] 1-14 [illegible]
[illegible] 1-21 [illegible]
[illegible] 1-[illegible] 44
[illegible] [illegible] 43
[illegible] [illegible] [illegible]

	Date	Page
Coal and natural gas winning U.S. bulk fuel battle with oil	4-22	41
Flex trend yields another oil strike off Texas	4-22	56
Seabed cleanup	5-6	69
Transco's discount program recaptures share of gas sales	5-6	80
Deep water, Mobile Bay tracts spark Sale 98	5-27	48
Digging up the turf	7-1	15
Competition, partial decontrol pose challenge to U.S. natural gas industry	7-1	19
Permian basin CO2 floods mushroom; more scheduled	7-8	17
Two lines struck take or pay clauses	7-15	65
Lease sale off Texas draws weak response	8-19	56
Panhandle white oil issue heats up	9-9	67
Exxon restructures gas transmission, marketing functions	9-23	65
Trends in computers	10-7	37
Gulf of Mexico area-wide sales draw kudos from operators	10-28	39
API REPORT: LL&E cuts costs, sheds nonoil, nongas assets	11-18	122
API REPORT: Diamond Shamrock's four-point plan balances value, flexibility	11-18	124
DEEPWATER TECHNOLOGY REPORT: Deepwater activity in gulf	12-2	64
Eastern gulf lease sale garners low bid total	12-23	28
Video teleconferencing links exploration offices	12-23	64
HAGAR, RICK, and TRUE, WARREN R. (Journal Staff)		
Pipeline construction to decline in non-Communist areas in 1985	1-21	15
HAGEN, RAYMOND W. JR., and SPARLIN, DERRY D. (International Completion Consultants Inc.)		
Sand control—1: Gravel packs require planning	6-3	87
Sand control—conclusion: Prevention of formation damage in [illegible]	6-17	92
HALES, M. (A/S Norske Shell); and MATEN, G. J. (Thomassen International BV)		
Subsea flowlines—1: J-tube pull-in theory is applied to North Sea's Troll multiple flowline bundles	9-23	139
Subsea flowlines—conclusion: Full-scale pull-in loads for multiple flowline bundles in North Sea's Troll field predicted	9-30	42
HALL, J. E. (Amoco Production Co.); and ROCHE, J. R. (Hydril Co.)		
OFFSHORE REPORT: Diverter for deepwater drilling rigs permits kick control	5-6	126
HALL, RANDY (Smith International Inc.)		
SII DAC Drilling Activity: Second most productive drilling year finishes with fourth-quarter drop in activity	2-18	96
HALLDEN, DONALD F. (LTV Energy Products)		
Enhancement of fiberglass sucker-rod design is offered	9-30	58
HALPERN, NORM (Halpern Associates Inc.)		
ANNUAL PETROCHEMICAL ISSUE: Novel organization working at Shell Canada facility	3-25	88
HAMMER, HAROLD H. (Gulf Oil Corp.)		
Comment: Who must decide what's best for oil firms and shareholders?	4-1	60
HANDLEY, O. D. (J. L. Davis Co.); and ANEROUSIS, J. P., and DAVIS, B. J. (Physichem Technologies Inc.)		
Iron sponge is economical and effective for NGL sweetening	4-22	120
HARPER, P. G., JARDINE, S. I., BULL, M., and TREHERNE, D. M. (Heriot-Watt University)		
Microcomputer applications for control of novel attitude direction sensing tool	2-11	113
HART, R. N. (Exxon)		
Exxon's field computer system, a seismic data acquisition system	9-30	76
HARTLEY, D., and CUNIC, J. D. (Exxon Research & Engineering Co.)		
FCCU fluegas scrubber experience updated	11-25	154
HARTLEY, D., SCHICHO, C. M., WATSON, E. A., and CLEM, K. R. (Exxon Research & Engineering Co.)		
System for degassing liquid sulfur can reduce total hydrogen sulfide to acceptable levels	10-14	56
HASAN, MISBAH, ALI, MOHAMMAD FARHAT, BUKHARI, AHMED, and SALEEM, MOHAMMAD (University of Petroleum and Minerals)		
Arabian crude oil residues evaluated	4-15	[illegible]
HAWES, CHARLES L. (Consultant)		
Simple method finds length in oil field tunnel	4-1	[illegible]
HAYES, JAMES A. (James A. Hayes & Associates Inc.)		
Futures markets add dimension to petroleum industry	[illegible]	[illegible]

	Date	Page
HAYES, LINDA (Petroware Systems Inc.); and WYMAN, RICHARD C. (Arthur Andersen & Co.); and SPIVEY, JOHN C., and IVEY, R. C. (E-Z Serve Softsearch Inc.)		
Computer aided petroleum engineering: a necessity for the competitive edge	5-27	112
HEALD, C. C., and PALGRAVE, R. (Ingersoll-Rand)		
Backflow control improves pump performance	2-25	96
HECK, W. E. (Tenneco Oil Processing & Marketing Co.); and RAGSDALE, RALPH (Stearns Catalytic Corp.)		
Tenneco revamps Chalmette refinery	1-14	79
HECKER, JAMES A., VanSCHAFTEN, GARY F., and ADKERSON, RICHARD C. (Arthur Andersen & Co.)		
INDEPENDENT OPERATIONS REPORT: Perspective the key to raising capital from institutions	10-28	101
HEGARTY, W. P. (Air Products & Chemicals Inc.); and GOAR, B. GENE (Goar, Arrington & Associates Inc.); and DAVIS, R., and KAMMILLER, R. (Conoco Inc.)		
Claus plant capacity boosted by oxygen-enrichment process	9-30	39
HEIN, MIKE (Simulation Sciences Inc.)		
MICROCOMPUTER REPORT: Pipeline flow analyses employ spreadsheet concept	2-11	68
HENDERSON, GERALD J., and TIMM, CAROLYN M. (ARCO Exploration Co.)		
Ordovician stratigraphic hydrocarbon entrapment potential of Appalachia	4-29	118
HESJE, R. C., and PETERSON, R. A. (Nova, an Alberta Corporation)		
Mechanical dry seal cuts pipeline compressor maintenance costs, downtime	3-18	150
HESSE, DAVID A. (Fluor Engineers Inc.)		
How the Dampier-to-Perth pipeline was commissioned	12-9	39
HEWITT, KEVIN J., BERZINS, WILLIAM E., FITZPATRICK, JOHN P., and HOGEBOOM, HARRY G. (Canadian Marine Drilling Ltd.)		
Canmar's berm-supported SSDC drilling advances arctic technology	7-1	39
HILL, A. D. (University of Texas); and JACKS, DONALD C. (Exxon Co. USA)		
Programs predict pressures for two-phase flow	9-16	93
HILL, JOHN (Merrill Lynch Economics Inc. Merrill Lynch Futures)		
INDEPENDENT OPERATIONS REPORT: Hedging in futures market offers degree of price certainty	10-28	90
HILL, M. J., ELLINGTON, REX T., and SAVIDGE, J. L. (University of Oklahoma)		
Online compressibility factors can improve metering by minimizing measurement error	9-2	70
HILSENTEGER, JIM, LINES, BRIAN, and MANKOWSKI, PAUL (Syncrude Canada Ltd.)		
Combined hydrocracking, coking aids bitumen upgrading	8-19	132
HIRCOCK, N. C., and DAVIET, G. R. (Dome Petroleum Ltd.)		
Improving LPG recovery at West Pembina	10-21	74
HLAVIN, ROBERT (Jacobs Engineering Group)		
New pseudo-critical pressure equations improve predictions	12-9	56
HLOZEK, ROBERT J. (Production Operators Inc.)		
ANNUAL PRODUCTION ISSUE: Engine-exhaust gas offers alternative for EOR	4-1	95
HOARD, R. E. (Phillips Petroleum Co.)		
Sonic waveform logging: a new way to obtain subsurface geologic information	4-1	70
HODGES, ROSS E. (Pipeline Consultant)		
PC program selects gas line size	4-1	116
HOEKS, C. P. (Dutch Service of Legal Metrology); and KOOI, A., and BELLINGA, H. (N.V. Nederlandse Gasunie); and van LAAK, F. A. L. (DSM); and ORBONS, P. J. (ARG)		
ANNUAL PIPELINE REPORT: Piston prover used to calibrate gas meters	8-19	84
HOGEBOOM, HARRY G., FITZPATRICK, JOHN P., BERZINS, WILLIAM E., and HEWITT, KEVIN J. (Canadian Marine Drilling Ltd.)		
Canmar's berm-supported SSDC drilling advances arctic technology	[illegible]	[illegible]

	Date	Page
HOLBERT, DON (Gaffney Cline & Assoc.)		
Conventional tubulars can cut cost of drilling in horizontal holes	6-3	68
HOLLO, REUVEN (Sigma Energy Consultants); and KHAN, IMRAN (University of Houston); and MERCHANT, MOE (IMCO Services)		
Microcomputing for oilmen—1: Options in microcomputing growing for hardware, software, and communications	4-16	[illegible]
ANNUAL DRILLING REPORT: Microcomputing for oilmen—2: Micros support decision-making, manage projects, do office work	4-23	154
Microcomputing for oilmen—conclusion: Checklist eases transition to computer use	[illegible]	116
HOLMAN, GEORGE B. JR., and KING, GEORGE E. (Amoco Production Research)		
Quality control at well site optimizes acidizing economics	3-26	139
HOLZMAN, HARRY T., and EISENHARDT, WILLIAM C. (Geomap Co.)		
Exploration and development—Gulf Coast Tertiary, 1983	[illegible]	[illegible]
HONEGGER, D. G. (National Technical Systems); and NYMAN, D. J. (Nyman Associates); and NYMAN, K. J. (Kuparuk Pipeline Co.)		
Wind-induced fatigue damage estimated for surface oil pipelines in the Arctic	[illegible]	34
HONEYBOURNE, WILL (Exploration Logging Inc.)		
Formation MWD benefits evaluation and efficiency	[illegible]	[illegible]
DRILLING TECHNOLOGY REPORT: Future measurement-while-drilling technology will focus on two levels	5-4	[illegible]
HOPSON, STEVE (Mitchell Energy Corp.)		
Amine inhibitor copes with corrosion	[illegible]	43
HORAK, RALPH L. (Mobil Exploration & Producing Services Inc.)		
Tectonic and hydrocarbon maturation history in the Permian basin	[illegible]	[illegible]
HOWELL, AVERY L. JR., and TOMPKINS, B. G. (Brown & Root International)		
OFFSHORE CONSTRUCTION REPORT: Analysis picks best offshore cable fireproofing	[illegible]	105
HOWELL, R. L., HUNG, C., GIBSON, K. R., and CHEN, H. C. (Chevron Research Co.)		
Catalyst selection important for residuum hydroprocessing	7-29	[illegible]
HUDSON, EDDIE J., and NEUSE, STEPHEN H. (Hudson Consultants Inc.)		
Quality of reserve estimate—1: Sifting through the mystery of reserve estimates	[illegible]	[illegible]
Quality of reserve estimate—2: Depletion stage determines most effective methods for reserve-estimate integrity	[illegible]	[illegible]
HUGGINS, PAUL (Engineering Consultant)		
Program evaluates component and blend viscosities	[illegible]	[illegible]
HUMPHRIES, ADRIAN P., DEMMEL, EDWARD J., YANIK, STEPHEN J., and CAMPAGNA, ROBERT J. (Harshaw Filtrol Partnership)		
FCC catalysts containing shape-selective zeolites boost gasoline octane number and yield	5-13	108
HUNG, C., HOWELL, R. L., GIBSON, K. R., and CHEN, H. C. (Chevron Research Co.)		
Catalyst selection important for residuum hydroprocessing	7-29	[illegible]
HUNT, RAY L. (Hunt Oil Co.)		
INDEPENDENT OPERATIONS REPORT: Forecasting seen difficult in era of restructuring	[illegible]	[illegible]
HURST, WILLIAM (Consultant)		
Conformal mapping solves intricate problems	1-28	138
Transient fluid flow applied to partially penetrated pay	[illegible]	[illegible]
HUXLEY, D. B., and CURTIS, M. I. (Sohio Petroleum Co.)		
ARCTIC DRILLING/DEVELOPMENT TECHNOLOGY REPORT: A new Arctic offshore field: Endicott on decade-long way to production	[illegible]	[illegible]
I		
ICHARA, MARK J. (S. T. Schlumberger); and AVBOVBO, AKPO A. (Nigerian National Petroleum Corp.)		
DRILLING TECHNOLOGY REPORT: [illegible] parameter, VSP trends	[illegible]	[illegible]
How to handle abnormal pressures in Nigeria's Niger Delta [illegible]	[illegible]	[illegible]
ISE, F. TOM (Consulting Geologist)		
Washington and Oregon: [illegible]	[illegible]	[illegible]
IVANHOE, L. F. (Consultant)		
Future oil discoveries of non-U.S. free world	6-24	120
Potential of world's significant oil provinces	11-18	164
IVEY, R. C., and SPIVEY, JOHN C. (E-Z Serve Softsearch Inc.); and WYMAN, RICHARD C. (Arthur Andersen & Co.); and HAYES, LINDA (Petroware Systems Inc.)		
Computer-aided petroleum engineering—a necessity for the competitive edge	5-21	112
J		
JACKS, DONALD C. (Exxon Co. USA); and HILL, A. C. (University of Texas)		
Programs predict pressures for two-phase flow	9-16	93
JACKSON, CURTIS W., WARREN, RONALD D., and SHAUGHNESSY, JOHN M. (Amoco Production Co.)		
DEEPWATER TECHNOLOGY REPORT: Well-control technique removes trapped gas from a subsea BOP	12-2	55
JACKSON, LAWRENCE, and SHANNON, ERNEST (British Gas Corp.); and ADEY, G. A. (British Pipeline Authority)		
British Gas has seamless pipe inspection program	9-9	147
JACKSON, U. G. (Exxon Chemical Americas)		
Smooth, early startup due to control system	4-22	85
JAMIESON, R. M. (TransCanada Pipelines Ltd.)		
Canadian line inspection procedures detailed	3-25	107
JANSON, JAN ERIK, and MOLIN, JAN (VBB AB); and ELIASSON, MAX (Sydkraft AF)		
Oresund submarine pipeline: Sweden's access to North Sea gas	10-7	120
JARDINE, S. I., HARPER, P. G., BULL, M., and TREHERNE, D. M. (Heriot-Watt University)		
Microcomputer applications for control of new acoustic direction-sensing tool	2-11	123
JENSEN, DAVID G., LEE, YUNG N., and SHAH, SUBHASH N. (Halliburton Services)		
Frac treatment quality improved with field rheology unit	2-4	47
JENYON, MALCOLM K. (Seismograph Service (England) Ltd.)		
Differential movement of salt rock	9-30	73
JINSI, B. K. (R. J. Brown & Associates BV)		
OFFSHORE CONSTRUCTION REPORT: Soil seismic studies essential for lines in earthquake areas	11-11	72
JOHNSON, A., and FISHER, I. P. (Gulf Canada Ltd.)		
Bag sampling aids FCCU studies	2-11	98
JOHNSON, J. A., ANDERSON, R. F., and MOWRY, J. R. (UOP Inc.)		
Process makes aromatics from LPG	12-2	128
JOHNSON, J. A., WEISZMANN, J. A., and SCHMIDT, R. J. (UOP Inc.)		
REFINING TECHNOLOGY REPORT: Catalysts key to low-cost isomerization	5-27	80
JOHNSON, JOHN E., RYAN, BERNARD F., and CASE, JAMES L. (Stearns Catalytic Corp.)		
CO_2-rich mixtures—1: CO_2 streams pose new design considerations	5-6	175
CO_2-rich mixtures—2: Water in high-CO_2 stream complicates design factors	5-13	103
JOHNSON, T. E., and MURPHY, J. R. (Air Products & Chemicals Inc.); and TASKER, K. G. (Hydrocarbon Research Inc.)		
Combined cracking processes boost fuel yields from low-quality crudes and residua	7-1	50
JOHNSTON, BERT E., and PURSER, JAMES (Southern Union Co.)		
Financial capital value criteria examined	4-9	158
JOHNSTON, DANIEL (Scotia Energy Inc.)		
Drilling statistics influence most appropriate [illegible] technique	12-30	136
JONES, DAVID E., and SHARK, GREGORY (American Bureau of Shipping)		
OFFSHORE CONSTRUCTION REPORT: Classification group looks at floating production storage and offloading systems	11-11	60
JOUANNEAU, JEAN-FRANCOIS, and BELLAMY, GILLES (Comex Services); and QUIN, RENE (Total Marine Norsk); and WIET, PAUL (Total Oil Marine)		
Pipeline repair technique [illegible]	[illegible]	[illegible]

	Date	Page
JUHL, GINGER M. (Synercom)		
Automation improves Arkla's petroleum mapping system	2-18	132
JUNKER, G., and VOGT, G. H. (Mannesmann Forschungsinstitut); and PEECK, A., and KOCH, F. O. (Hoesch Rohr AG); and MAXEY, W. A. (Battelle Memorial Institute); and PETERS, P. A. (Mannesmannrohren-Werke AG); and KUGLER, J., and SEIFERT, K. (Stahlwerke Peine-Salzgitter AG)		
Transition temperature tests show fracture behavior	4-22	75
K		
KALTENBACK, A. J. (Marathon Oil Co.); and LINDBERG, F. A. (Analex); and REITSEMA, ROBERT H. (Consultant)		
Quantitative mud-logging system tracks upward gas migration from the pay zone	10-28	116
KAMMILLER, R., and DAVIS, R. (Conoco Inc.); and HEGARTY, W. P. (Air Products & Chemicals Inc.); and GOAR, B. GENE (Goar, Arrington & Associates Inc.)		
Claus plant capacity boosted by oxygen-enrichment process	9-30	39
KENDRICK, TOM (Kendrick & Sons); and MORRIS, MIKE (Computer Ventures)		
Apple system adapted for mud logging	9-2	72
KENNEDY, JOHN L. (Journal Staff)		
Thanks, Daimler and Benz	4-29	37
Because. That's why	7-15	37
More than just pig iron	12-16	39
KERRY, FRANK GEORGE (F. G. Kerry Inc.)		
CONTROL VALVE REPORT: Cryogenic control-valve selection is exacting	12-16	96
KHAN, A. U., DILLON, K., and STRIPLING, T. E. (Brown & Root)		
Hydraulic analysis aids high-pressure system design	1-28	125
KHAN, IMRAN (University of Houston); and HOLLO, REUVEN (Sigma Energy Consultants); and MERCHANT, MOE (IMCO Services)		
Microcomputing for oilmen—1: Options in microcomputing growing for hardware, software, and communications	9-16	107
ANNUAL DRILLING REPORT: Microcomputing for oilmen—2: Micros support decision-making, manage projects, do office work	9-23	104
Microcomputing for oilmen—conclusion: Checklist eases transition to computer use	10-7	116
KHAN, SHUAIB A. (Esso Resources Canada Ltd.)		
Expander-gas processing plant converted to boost C_3 recovery at Canada's Judy Creek	6-3	78
KIEFNER, JOHN F., and FORTE, THOMAS C. (Battelle Columbus Laboratories)		
Hydrostatic retesting—1: Model predicts hydrostatic retest intervals	1-7	93
Hydrostatic retesting—Conclusion: Model shows value of wide pressure margins	1-14	83
KIEFNER, JOHN F., and WALL, T. A. (Battelle Columbus Laboratories)		
Pipeline lowering—1: Calculations help control stresses	10-14	128
Pipeline lowering—conclusion: Calculations for lowering method hold stress within fixed limits	10-21	70
KILENYI, TOM, and STANDLEY, BOB (Merlin Profilers Ltd.)		
ANNUAL GEOPHYSICAL REPORT: Petroleum prospects in the northwest seaboard of Scotland	10-7	100
KING, GEORGE E., and HOLMAN, GEORGE B. JR. (Amoco Production Research)		
Quality control at well site optimizes acidizing economics	3-18	136
KINGSTON, D. R., DISHROON, C. P., and WILLIAMS, P. A. (Esso Exploration Inc.)		
A hydrocarbon exploration crustal classification	3-11	146
Global basin classification system	5-6	238
Hydrocarbon plays: global basin classification	5-6	265
KINNEY, GENE T. (Journal Staff)		
Budgeting in the dark	[illegible]	41
After the restructuring	5-13	53
Who's restructuring?	[illegible]	[illegible]
How they're restructuring	[illegible]	[illegible]
KIRKWOOD, CHARLIE (Independent oilman)		
The Chinese offshore exploration agreements	[illegible]	[illegible]
Chinese oil production through 1990	[illegible]	[illegible]
KNOWLTON, JACK (Smith International Inc.)		
Sii/DAC Drilling Activity: Deeper drilling boosts footage totals; well counts are flat	5-13	117
Sii/DAC Drilling Activity: Gains across Central U.S., deeper wells lift drilling totals	8-19	116
Sii/DAC Drilling Activity: Footage, wells suffer biggest quarterly drop	12-16	115
KOCH, F.O., and PEECK, A. (Hoesch Rohr AG); and MAXEY, W. A. (Battelle Memorial Institute); and JUNKER, G., and VOGT, G. H. (Mannesmann Forschungsinstitut); and PETERS, P. A. (Mannesmannrohren-Werke AG); and KUGLER, J., and SEIFERT, K. (Stahlwerke Peine-Salzgitter AG)		
Transition temperature tests show fracture behavior	4-22	75
KOENIG, J. W. J., OPITZ, H. M., QUEME, J. P. SIBRA, P., SOBEL, R. TH., VLEMMINGS, J. M. L. M., WALLER, G. J., CONRARD, M. C., and CREMER, G. (Concawe)		
Major study reveals EEC gas oil desulfurization costs	1-21	55
KOGER, DAVID G., MORGAN, KEN M., LAMBERT, DAVID D., and WILHELM, STEVEN (Texas Christian University)		
Recent advancements in the resolution of Landsat imagery for geologic mapping	12-23	66
KOHAN, DONALD (Scientific Design Co.)		
CONTROL VALVE REPORT: Criteria given for sizing and selection of control valves	12-16	76
KOHLER, R. (Union Carbide Canada); and WONG, H. A. (Chevron Canada Resources Ltd.); and KOSSEIM, A. J., KUBEK, D. J., and McCULLOUGH, J. G. (Union Carbide Corp.)		
Corrosion-inhibition system passes severest test at Chevron's Princess MEA plant	11-11	100
KOOI, A., and BELLINGA, H. (N.V. Nederlandse Gasunie); and HOEKS, C. P. (Dutch Service of Legal Metrology); and van LAAK, F. A. L. (DSM); and ORBONS, P. J. (ARG)		
ANNUAL PIPELINE REPORT: Piston prover used to calibrate gas meters	8-19	89
KOSSEIM, A. J., KUBEK, D. J., and McCULLOUGH, J. G. (Union Carbide Corp.); and KOHLER, R. (Union Carbide Canada); and WONG, H. A. (Chevron Canada Resources Ltd.)		
Corrosion-inhibition system passes severest test at Chevron's Princess MEA plant	11-11	100
KREUTER, DAVID (David & Gordon P.C.)		
INDEPENDENT OPERATIONS REPORT: Care required in raising funds from investors	10-28	85
KROOP, L., and SIGMUND, P. W. (Union Carbide Corp.); and TAGGART, G. W. (Ford, Bacon & Davis Inc.)		
Tail-gas treating system proves out in field test on operating Claus plant	6-3	64
KUBEK, D. J., KOSSEIM, A. J., and McCULLOUGH, J. G. (Union Carbide Corp.); and KOHLER, R. (Union Carbide Canada); and WONG, H. A. (Chevron Canada Resources Ltd.)		
Corrosion-inhibition system passes severest test at Chevron's Princess MEA plant	11-11	100
KUGLER, J., and SEIFERT, K. (Stahlwerke Peine-Salzgitter AG); and PETERS, P. A. (Mannesmannrohren-Werke AG); and VOGT, G. H., and JUNKER, G. (Mannesmann Forschungsinstitut); and PEECK, A., and KOCH, F. O. (Hoesch Rohr AG); and MAXEY, W. A. (Battelle Memorial Institute)		
Transition temperature tests show fracture behavior	4-22	75
KUMAR, K. H., and WATANASIRI, S. (University of Oklahoma); and BRULE, M. R. (Kerr-McGee Corp.)		
Characterization methods improve phase-behavior predictions	2-11	87
KUO, CHIA MING, WRENCH, RICHARD E., and YEN, LEWIS C. (M. W. Kellogg Co.)		
FCCU regenerator temperature effects evaluated	9-16	87
L		
LAM, SIMON, and WAHLMEIER, MARK (Dowell Schlumberger)		
Mathematical algorithm aids analysis of 'U-tubing' during slurry placement	[illegible]	80
LAMBERT, DAVID D., KOGER, DAVID G., MORGAN, KEN M., and WILHELM, STEVEN (Texas Christian University)		
Recent advancements in the resolution of Landsat imagery for geologic mapping	12-23	66
LANA, MARCOS, MILANI, EDSON, SZATMARI, PETER, CONCEICAO, JOAO, and LOBO, ANTONIO (Petrobras Research Center)		
How South Atlantic rifting affects Brazilian oil reserves distribution	1-14	[illegible]

	Date	Page
LANDERS, MICHAEL O. (Peat, Marwick, Mitchell & Co.)		
Comment: Marketing cooperative offers independents a way to sell gas	10-21	32
LANE, STEPHEN M., COX, THOMAS, F., and ARONOFSKY, JULIUS S. (Gaffney, Cline & Associates Inc.)		
Reservoir simulation moves into third generation	11-4	75
LAWRENCE, STEVE, and COSTER, PETER (Exploration Consultants Ltd.)		
Petroleum potential of Offshore Guyana	12-9	67
LEE, YUNG N., JENSEN, DAVID G., and SHAH, SUBHASH N. (Halliburton Service)		
Frac treatment quality improved with field rheology unit	2-4	47
LEIGHTON, ALAN J. (Leighton Consulting Services); and WAYLAND, J. R. JR. (Sandia National Laboratories)		
Mapping technology: a key to EOR control	12-2	109
LEINEKE, RON (Venada National)		
N. California dry gas fields brighten 1984 runs	4-15	88
LEONARD, JIM (Journal Staff)		
Completion problems	4-1	37
LESTER, C. B. (C. B. Lester & Associates Inc.)		
Drag-reducing agents—1: The basics of drag reduction	3-4	51
Drag-reducing agents—2: Here's how drag-reducing agents can cut need for looping or boosting	3-18	78
Drag-reducing agents—3: How active, passive drag affect DRA injections	4-1	107
Drag-reducing agents (Conclusion): What to expect from and how to handle commercially available drag-reducing agents	[illegible]	116
LEUENBERGER, E. L. (Englehard Corp.)		
Method predicts activity of vanadium-contaminated FCC catalysts	7-15	125
LEVESQUE, CHARLES J. (Hydril Co.)		
Protect threads while plastic-coating pipe	7-8	44
LEWIS, C. P. G. (Shell Research B.V.); and QUILLET, R. (Shell Recherche S.A.); and SCHREUDER, T. (Shell Curacao N.V.)		
Resid fuel-oil stability, cleanliness test improved	4-8	75
LICHTBLAU, JOHN H. (Petroleum Industry Research Foundation Inc.)		
Comment: U.S. tax proposals carry big reserves, production penalty	1-14	40
LIEBERMAN, NORMAN P. (Consultant)		
Shot coke: its origins and prevention	7-8	45
LIGHT, WALTER S. JR. (Lightning Oil Co.)		
Amoco ignites new South Texas Jurassic play	8-19	142
LIN, CHUNG (Oasis Oil Co.); and ROWLAND, DAVID A. (University of Texas Permian Basin)		
Hyperbolic decline—1: New linear method gives constants of hyperbolic decline	1-14	86
Hyperbolic decline (Conclusion): Computer model solution proposed	1-21	77
LINDBERT, F. A. (Analex); and REITSEMA, ROBERT H. (Consultant); and KALTENBACK, A. J. (Marathon Oil Co.)		
Quantitative mud-logging system tracks upward gas migration from the pay zone	10-28	116
LINES, BRIAN, HILSENTEGER, JIM, and MANKOWSKI, PAUL (Syncrude Canada Ltd.)		
Combined hydrocracking, coking aids bitumen upgrading	8-19	131
LINGE, F. (Shell International); and WU, C. H., and STARTZMAN, R. A. (Texas A&M University)		
Numerical simulator looks at cold-water injection and skin factor in damage assessment	1-7	51
LINVILLE, A. F., and DABLAIN, M. A. (Mobil Research & Development Corp.)		
Case study in seismic diffraction near a gulf coast salt dome	[illegible]	[illegible]
LOBO, ANTONIO, CONCEICAO, JOAO, LANA, MARCOS, MILANI, EDSON, and SZATMARI, PETER (Petrobras Research Center)		
How South Atlantic rifting affects Brazilian oil reserves distribution	[illegible]	[illegible]
LOIRE, RENE (Tramco S.A.); and ARNAUD, JEAN (NAT); and PAGEZY, MICHEL (BSFE); and PIASECKYJ, PETER J. (Duxbury Offshore Inc.)		
OFFSHORE REPORT: [illegible]	[illegible]	[illegible]
LOPEZ, DAVID A. (North American Resources Co. Inc.); and SCHMIDT, CHRISTOPHER (Western Michigan University)		
ANNUAL GEOPHYSICAL REPORT: Seismic profile across the leading edge of the fold and thrust belt of SW Montana	10-7	71
LORENZ, JOHN C., and RUTLEDGE, ANNE K. (Sandia National Laboratories)		
Facies relationships, reservoir potential of Ohio Creek interval across the Piceance Creek basin	1-21	91
LUH, P. C., and BICKEL, S. H. (Arco Oil & Gas)		
Thin bed velocity resolution	4-8	126
LUMM, D. K., and NELSON, W. J. (Illinois Department of Energy & Natural Resources)		
Shawneetown fault zone, Southeast Illinois: structure and petroleum possibilities	6-17	144
LUMPKIN, WILLIAM C. (Exxon Pipe Line Co.)		
DEEPWATER TECHNOLOGY REPORT: Deepwater pipelay connects tower platform	12-2	60
LUND, S. (Statoil); and AKTEN, H. T., PAGE, R. T., and BINNS, K. A. (Fluor Ocean Services Ltd.)		
Cathodic protection, coatings protect Statpipe system	11-25	47
LUTHER, LESTER C. (California State University)		
Linearization and regression analysis technique predicts hyperbolic decline in reserves	8-26	78
LYGEROS, A. I. (Hellenic Aspropyrgos Refinery S.A.); and MAGOULAS, K. G. (National Technical University of Athens)		
Distillation unit design—1: Method quickly optimizes process design	8-26	55
Distillation unit design (conclusion): Method sizes equipment and estimates costs	9-9	129
LYONS, THOMAS R., and MONTGOMERY, SCOTT (Albuquerque, N.M.)		
Kaiparowits basin: an oil frontier with low potential	1-7	112
M		
McBEATH, R. G., SANDERS, J. I., GILBERT, G. M., and EINARSSON, T. D. (Geophysical Service Inc.)		
ANNUAL GEOPHYSICAL REPORT: 3D marine systems—an exploration tool	10-7	84
McCASLIN, JOHN C. (Journal Staff)		
FORECAST REVIEW: Drilling recovery starts in last half of 1984	1-28	107
Union scores three ways with W. Va. find	1-28	157
Amoco stakes deep Denver basin wildcat	2-4	75
New era seen possible for Ark-La-Tex area	2-25	121
Leasing reflects high hopes in Northwest	3-4	131
EXPLORATION DEVELOPMENT USA: Drilling steady throughout U.S. East, Southeast	3-11	102
Texaco eyes potential of new Rockies area	3-11	145
Financial risk stymies hunt in Pennsylvania	3-18	163
Oregon's Mist field drawing new interest	4-8	117
Minnelusa fever breaks out in the Rockies	4-15	81
Hardeman drilling moves into Oklahoma	4-22	133
Paleozoics targeted in Denver basin	4-29	117
Utah areas promise further success	5-6	237
Future of gas lies in conventional sources	5-13	133
SE Pennsylvania hosts unusual wildcat	5-27	123
Gulf plans Tucumcari basin wildcat	6-3	85
Gas finds stir Michigan deep drilling hunt	6-10	163
Exxon and Chevron score in Mobile Bay	6-17	143
Texaco's drilling deep Big Horn flank test	6-24	123
New gas find heats up Tucumcari play	7-1	69
Operators hunt for oil in big gas province	7-8	67
Cretaceous [illegible] Paleozoic find	7-22	121
MIDYEAR FORECAST REVIEW: U.S. due another drop in number of active rigs	7-29	106
Bass Islands trend draws drilling interest	7-29	161
Much interest near Oregon's Mist field	8-5	115
Holbrook basin area awaits drill bit	8-12	111
Wildcat to probe northern Nevada basin	8-19	141
Michigan reef wells finally go on stream	8-26	93
Champlin stakes remote Colorado wildcat	9-9	179
[illegible] Denver basin [illegible]	9-16	126
Look for more [illegible] in Colorado	9-23	154
[illegible] continues to [illegible]	9-30	147
Black Warrior basin yields deep gas [illegible]	[illegible]	114
[illegible] Michigan basin [illegible] deep gas [illegible]	[illegible]	134
[illegible]	[illegible]	104
[illegible]	[illegible]	[illegible]

	Date	Page
Operators cautiously continue Alberta play	12-16	127
Survey heightens prospects off Tasmania	12-23	63
Deep search still brisk in Michigan basin	12-30	161
McCOLLOUGH, CHUCK, and PADFIELD, EARL (Occidental Exploration & Production Co.)		
Petroleum geology of Colombia's Llanos basin: a summary	4-15	82
McCONNELL, DONALD P., and STEPHENS, DENNY R. (Batteile Petroleum Technology Center)		
Riser design codes—1: Offshore pipeline design codes compared for loads, stress limits	7-15	128
Riser design codes—conclusion: Pipeline design codes compared graphically	7-29	139
McCULLOUGH, J. G., KUBEK, D. J., and KOSSEIM, A. J. (Union Carbide Corp.); and KOHLER, R. (Union Carbide Canada); and WONG, H. A. (Chevron Canada Resources Ltd.)		
Corrosion-inhibition system passes severest test at Chevron's Princess MEA plant	11-11	100
McCULLOUGH, W. D., and CUMBERLIDGE, J. T. (Hanna Petroleum Co.)		
Economic profile of Ohio's Clinton sand	5-13	91
McDONALD, G. W. G. (IONA Ltd.)		
Refinery economics affected by FCC impact on alkylation	4-1	111
MacDONALD, ROBERT C., CAMPBELL, JAMES E., PAHWA, SURESH B., and STATHAM, WILLIAM H. (Intera Technologies Inc.)		
MICROCOMPUTER REPORT: Microcomputers aid investment decisions	2-11	63
McGILLIVRAY, TERRENCE L., and COULL, THOMAS B. (PMB Systems Engineering Inc.)		
OFFSHORE REPORT: Compliant jacket challenges deep water with new design	5-6	112
McKEE, F., and GOLDZBERG V. (Delta-X Corp.)		
ANNUAL PIPELINE REPORT: Model predicts liquid accumulation, severe terrain-induced slugging for two-phase lines	8-19	105
MacKENZIE, D. H. (Propak Systems Ltd.); and DONNELLY, S. T (Propak Systems Inc.)		
Mixed refrigerants proven efficient in natural-gas-liquids recovery process	3-4	116
McREE, ROBERT L., GUTIERREZ, RICHARD, and BLANDFORD, JOSEPH W. (Atlantia Engineering)		
DRILLING TECHNOLOGY REPORT: Mini-platform accelerates production, saves expendable wells	3-4	76
MADDOX, R. N., and SAFTI, MOHSEN VAFAIE (Oklahoma State University)		
Slip velocity added to two-phase pipeline calculations	6-17	94
MAGEE, J. S., CORMIER, W. D., and WOLTERMANN, G. M. (Katalistics Inc.)		
REFINING TECHNOLOGY REPORT: Octane catalysts contain special sieves	5-27	59
MAGOULAS, K. G. (National Technical University of Athens); and LYGEROS, A. I. (Hellenic Aspropyrgos Refinery S.A.)		
Distillation unit design—1: Method quickly optimizes process design	8-26	55
Distillation unit design (conclusion): Method sizes equipment and optimizes costs	9-9	129
MAHINI, AMIR, and DeNERO, HENRY T. (McKinsey & Co. Inc.)		
How to meet overseas content laws	2-4	68
MALEC, D. R., and PETERS, D. L. (Nalco Chemical Co.)		
ETHYLENE REPORT: Hydrocarbon leak detector keeps ethylene plant on stream	9-2	53
MANESS, S. F., CLEMENT, C. C., and MASON, C. M. (Sohio Petroleum Co.)		
Sohio task group finds better completion techniques for Anadarko basin gas wells	8-26	71
MANKOWSKI, PAUL, LINES, BRIAN, and HILSENTEGER, JIM (Syncrude Canada Ltd.)		
Combined hydrocracking, coking aid bitumen upgrading	[illegible]	[illegible]
MANNING, W. P., DEETZ, J. A., and BYESEDA, J. J. (C-E Natco, Combustion Engineering Inc.)		
New gas sweetening solvent proves successful in four field trials	[illegible]	132
MANZUR, AKKAS (Western Geophysical Co.)		
ANNUAL GEOPHYSICAL REPORT: Delineation of salt masses using borehole seismics	10-7	147
MARIANI, OSCAR, and BATTARRA, VILLIAM (Snamprogetti S.p.A.); and GENTILINI, MARCO (University of Bologna); and GIACCHETTA, GIANCARLO (University of Ancona)		
Condensate-line correlations for calculating holdup, friction compared to field data	12-30	148
MARSHALL, JOE F. JR., and BOWMAN, GEORGE W. II (Boffin Inc.)		
MICROCOMPUTER REPORT: Decline curve software closes the gap	2-11	81
MARTIN, GARY C., FLETT, TABE O., TURNER, RONALD F., and STEFFY, DAVID A. (U.S. Geological Survey)		
Evolution and petroleum geology of the Navarin basin, Bering Sea, Alaska	8-5	116
MARTY, PIERRE (CFP Total)		
OFFSHORE CONSTRUCTION REPORT: Faulting, typhoons key to Weizhou 10-3 plans	11-11	86
MASON, C. M., MANESS, S. F., and CLEMENT, C. C. (Sohio Petroleum Co.)		
Sohio task group finds better completion techniques for Anadarko basin gas wells	8-26	71
MATEN, G. J. (Thomassen International BV); and HALES, M. (A/S Norske Shell)		
Subsea flowlines—1: J-tube pull-in theory is applied to North Sea's Troll multiple flowline bundles	9-23	138
Subsea flowlines (conclusion): Full-scale pull-in loads for multiple flowline bundles in North Sea's Troll field predicted	9-30	42
MATER, JAMES L., WADE, CHRIS J., and VERM, RICHARD W. (Floating Point Systems)		
ANNUAL GEOPHYSICAL REPORT: High-performance 3D migration of seismic data	10-7	92
MATSON, JACK V., MOUCHE, WENDY G., and ROSENBLUM, ERIC (University of Houston)		
Sidestream softening system cuts petrochem plant's effluent	5-20	76
MATTHEWS, J. C. (Commercial Industry); and MATTHEWS, W. R. (Consultant)		
Program calculates frac gradients for many basins	7-8	39
MATTTHEWS, THOMAS S. (University of Houston)		
Site theft reduced by microcomputer	2-4	66
MATTHEWS, W. R. (Consultant); and MATTHEWS, J. C. (Commercial Industry)		
Program calculates frac gradients for many basins	7-8	39
MATTY, JANE M., and TOMSON, MASON B. (Rice University); and ROGERS, LEO A. (Gas Research Institute); and DURRETT, LARRY R. (W. K. Technology Inc.)		
ANNUAL PRODUCTION ISSUE: Saturation index predicts brine's scale-forming tendency	4-1	97
MAULEON, J. L., and COURCELLE, J. C. (Total-France)		
FCC heat balance critical for heavy fuels	10-21	64
MAXEY, W. A. (Battelle Memorial Institute); and KOCH, F. O., and PEECK, A. (Hoesch Rohr AG); and JUNKER, G., and VOGT, G. H. (Mannesmann Forschungsinstitut); and PETERS, P. A. (Mannesmannrohren-Werke AG); and KUGLER, J., and SEIFERT, K. (Stahlwerke Peine-Salzgitter AG)		
Transition temperature tests show fracture behavior	4-22	75
MAY, T. W., and BICKEL, S. H. (ARCO)		
ANNUAL GEOPHYSICAL REPORT: Seismic velocity—1: The effects of compaction on moveout	10-7	149
Seismic velocity—2: How compaction affects dipping beds	10-14	142
MERCHANT, MOE (IMCO Services); and KHAN, IMRAN (University of Houston); and HOLLO, REUVEN (Sigma Energy Consultants)		
Microcomputing for comers—1: Options in microcomputing growing for hardware, software, and communications	[illegible]	[illegible]
ANNUAL DRILLING REPORT: Microcomputing for comers—2: Micros support decision-making, manage projects, do office work	[illegible]	104
Microcomputing for comers (conclusion): [illegible] computer use	[illegible]	[illegible]

Date Page

MEYER, BRUCE R. (Meyer & Associates Inc.)
Frac model in 3D—1: New simulator makes fracture design routine 6-17 87
Frac model in 3D—2: Proppant placement analyzed 7-1 62
Frac model in 3D—3: Hydraulic fracturing simulator's capabilities examined 7-22 83
Frac model in 3D—conclusion: Graphics module outputs fracturing results 7-29 132

MEYER, TIMOTHY R. (Texas Gas Transmission Corp.)
Model changes improve compressor-station piping pressure-loss predictions 4-29 96

MILANI, EDSON, SZATMARI, PETER, LANA, MARCOS, CONCEICAO, JOAO, and LOBO, ANTONIO (Petrobras Research Center)
How South Atlantic rifting affects Brazilian oil reserves distribution 1-14 [illegible]

MOLIN, JAN, and JANSON, JAN ERIK (VBB AB); and ELIASSON, MAX (Sydkraft AF)
Oresund submarine pipeline: Sweden's access to North Sea gas 10-7 [illegible]

MONDSHINE, TOM (TBC-Brinadd)
Completion-fluids weight range expanded 11-18 145

MONTGOMERY, SCOTT, and LYONS, THOMAS R. (Albuquerque, N.M.)
Kaiparowits basin: an old frontier with new potential 1-7 115

MOORE, TIM (Placid Oil Co.)
The geology of Oakvale field 2-4 [illegible]

MOORE, W. D. III (Journal Staff)
Borders and technology 3-4 37
OFFSHORE REPORT: Offshore drilling rebounds, prompts new construction 5-6 133
Blowout ignites writer 6-17 53
Send SASE 9-23 37
ANNUAL DRILLING REPORT: Drilling faces fair year for wells and footage, only mediocre for rig demand 9-23 71
Antidote for Murphy 12-2 23

MORGAN, JOSEPH M. (Pipeline Engineering Consultant)
OGJ Morgan Gas-Pipeline Cost Index (1st QTR '84): Activity, costs up in competitive market 1-23 81
OGJ Morgan Pipeline Cost Index—Oil (2nd Quarter '84): Lower labor costs flatten construction index curve 2-25 92
OGJ Morgan Pipeline Cost Index—Gas (2nd Qtr. '84): Construction activity increases, prices hold 3-25 126
OGJ Morgan Pipeline Cost Index—Oil (3rd Qtr. '84): Lower labor costs helped hold oil pipeline-building index to slight increase 5-13 120
OGJ Morgan Pipeline Cost Index—Gas (3rd Qtr 1984): Gas-pipeline construction costs rise fractionally 6-17 92
OGJ Morgan Pipeline Cost Index—Oil (4th Qtr 1984): Costs advance slowly despite building rebound 8-12 97
OGJ Morgan Pipeline Cost Index—Gas (4th Qtr 1984): Planned construction activity leaped, costs crept ahead 9-16 101
OGJ Morgan Pipeline Cost Index—Oil (1st Qtr 1985): Construction costs continue 1984's moderate pace 11-4 99
PIPELINE ECONOMICS REPORT: OGJ-Morgan Pipeline Cost Index—Gas (1st QTR 1985): Construction costs continue flat, while offshore activity shows promise 11-25 82
OGJ Morgan Pipeline Cost Index—Oil (2nd Qtr 1985): Cost easing continues in face of recovery 12-30 153

MORGAN, KEN M., KOGER, DAVID G., LAMBERT, DAVID D., and WILHELM STEVEN (Texas Christian University)
Recent advancements in the resolution of Landsat imagery for geologic mapping 12-23 66

MORIARTY, RICHARD D., and PELHAM, ROGER O. (Profimatics Inc.)
REFINING TECHNOLOGY REPORT: Surveys show more energy reduction still possible 9-27 [illegible]

MORRIS, MIKE (Computer Ventures); and KENDRICK, TOM (Kendrick & Sons)
Apple system adapted for mud logging [illegible] [illegible]

MORRIS, WILLIAM E. (William E. Morris Inc.)
ANNUAL REFINING ISSUE: Gasoline composition [illegible] [illegible] [illegible]
Interaction blending approach works for diesel fuel [illegible] [illegible]

MOUCHE, WENDY G., MATSON, JACK V., and ROSENBLUM, ERIC (University of Houston)
Sidestream softening system cuts petroleum plant's effluent [illegible] [illegible]

MOUSSELLI, A. H. (Applied Offshore Technology Inc.)
Read-only memory pipelay analysis module written for hand-held computer [illegible] [illegible]

Date Page

MOWRY, J. R., ANDERSON, R. F., and JOHNSON, J. A. (UOP Inc.)
Process makes aromatics from LPG 12-2 128

MOYSE, B. M., ALBJERG, A., and COOPER, B. H. (Haldor Topsoe Inc.)
Pore size of FCC pretreat catalyst important 3-11 111

MUHAIYUDDIN, MOHD YUSOF, RIEB, S. L., and BRAMI, J. B. (Esso Production Malaysia Inc.)
History and geology of Malaysia's Tinggi field 2-18 127

MUHSIN, M. A., and BORAI, A. M. (Abu Dhabi Marine Operating Co.)
LDT tool gives improved formation evaluation 7-8 60

MULLER, HERMAN L., and COHEN, LAURENCE H. (Amoco Oil Co.)
Methanol cannot economically dislodge gasoline 1-28 119

MURDOCH, J. ROBERT (JRM Consultants Inc.)
Price uncertainty makes financial planning vital 10-28 98

MURPHY, J. R., and JOHNSON, T. E. (Air Products & Chemicals Inc.); and TASKER, K. G. (Hydrocarbon Research Inc.)
Combined cracking processes boost fuel yields form low-quality crudes and residua 7-1 50

MURPHY, R. E., and DEAN, P. D. (Northwest Pipeline Co.); and GORDON, EDWARD (Fluor Engineers Inc.)
Leak, rupture detection can be improved 11-4 84

N

NAT, PIETER J., and van HOUTERT, FRANS W. (Azko Chemie Nederland); and ASIM, MEHMET Y., and DESAI, PANKAJ H. (Azko Chemie America)
Mild hydrocracking of FCC feeds produces yield benefits in mid-distillates, gasoline 7-22 106

NEAL, JOHN A., ZDYBAK, JAN M. L., and BANNERMAN, WYBURN G. (Georgia-Pacific Corp.)
Lignosulfonate copolymer stabilizes lime muds 3-25 118

NEIDHARDT, DIETMAR (Oiltools International)
DRILLING TECHNOLOGY REPORT: Rig-site system allows water reuse, cuts cleanup costs 3-4 88

NELSON, W. J., and LUMM, D. K. (Illinois Department of Energy & Natural Resources)
Shawneetown fault zone: Southeast Illinois structure and petroleum possibilities 6-17 144

NEUSE, STEPHEN H., and HUDSON, EDDIE J. (Hudson Consultants Inc.)
Quality of reserve estimate—1: Cutting through the mystery of reserve estimates 3-25 103
Quality of reserve estimate—2: Depletion stage determines most effective methods for reserve-estimate integrity 4-1 80

NICOLAI, HEINZ G. (Snamprogetti S.p.A.)
Laboratory, test-loop analyses illustrate waxy-crude transport methods 11-18 132

NWACHUKWU, JOSEPH I. (University of Ife)
Global distribution of terrestrial organic matter: a possible guide in petroleum exploration 5-20 92

NYMAN, D. J. (Nyman Associates); and HONEGGER, D. G. (National Technical Systems); and NYMAN, K. J. (Kuparuk Pipeline Co.)
Wind-induced fatigue damage estimated for surface oil pipelines in the Arctic 7-8 49

NYMAN, K. J. (Kuparuk Pipeline Co.), and NYMAN, D. J. (Nyman Associates), and HONEGGER, D. G. (National Technical Systems)
Wind-induced fatigue damage estimated for surface oil pipelines in the Arctic 7-8 49

O

OBEL, MICHAEL (Journal Staff)
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

	Date	Page
OBEL, MICHAEL, and BECK, ROBERT J. (Journal Staff)		
World crude, condensate flow in '84 logs first increase since '79	3-11	41
OBEL, MICHAEL, and PETZET, G. ALAN (Journal Staff)		
U.S. ammonia industry sees end to 5 year downturn	2-11	25
OBEL, MICHAEL, and VIELVOYE, ROGER (Journal Staff)		
Big Singapore refining center faces sharp drop in crude runs	11-18	57
OBUASI, P. A. (University of Maiduguri)		
Nigerian refineries strive for product balance	6-17	110
OPITZ, H. M., QUEME, J. P., SIBRA, P., SOBEL, R. TH., VLEMMINGS, J. M. L. M., WALLER, G. J., CONRARD, M. C., CREMER, G., and KOENIG, J. W. J. (Concawe)		
Major study reveals EEC gas oil desulfurization costs	1-21	55
ORBONS, P. J. (ARG); and van LAAK, F. A. L. (DSM); and HOEKS, C. P. (Dutch Service of Legal Metrology); and KOOI, A., and BELLINGA, H. (N.V. Nederlandse Gasunie)		
ANNUAL PIPELINE REPORT: Piston prover used to calibrate gas meters	8-19	89
OSMAN, MOHAMMED E., and EL-FEKY, SAMY A. (University of United Arab Emirates)		
Design methods for two-phase pipelines compared, evaluated	9-2	57

P

	Date	Page
PACKER, DUANE R. (Consultant); and VAN ALSTINE, DAVID R., and BLEAKLY, DOUGLAS C. (Z-Axis Exploration)		
Core orientation—1: Controlling errors minimizes risk and cost in core orientation	12-2	103
Core orientation—conclusion: How to evaluate orientation data, quality control	12-9	46
PADFIELD, EARL, and McCOLLOUGH, CHUCK (Occidental Exploration & Production Co.)		
Petroleum geology of Colombia's Llanos basin: a summary	4-15	82
PAGE, R. T., AKTEN, H. T., and BINNS, K. A. (Fluor Ocean Services Ltd.); and LUND, S. (Statoil)		
Cathodic protection, coatings protect Statpipe system	12-23	47
PAGEZY, MICHEL (BSFE); and LOIRE, RENE (Tramco S.A.); and ARNAUD, JEAN (NAT); and PIASECKYJ, PETER J. (Duxbury Offshore Inc.)		
OFFSHORE REPORT: Simplified production-mooring system developed	5-6	136
PAHWA, SURESH B., CAMPBELL, JAMES E., MacDONALD, ROBERT C., and STATHAM, WILLIAM H. (Intera Technologies Inc.)		
MICROCOMPUTER REPORT: Microcomputers aid investment decisions	2-11	63
PALGRAVE, R., and HEALD, C. C. (Ingersoll-Rand)		
Backflow control improves pump performance	[illegible]	46
PANO, B. V., BASSLER, E. J., and CHONG, E. S. (Stone & Webster Engineering Corp.)		
Process integration can provide flexibility for lower olefins production	9-16	96
PARKER, MARCIA A. (Journal Staff)		
Independent producers tapping new sources of capital	1-7	43
Institutional capital	[illegible]	[illegible]
Mulling mergers	[illegible]	31
Less developed countries push campaigns to tap foreign [illegible]	[illegible]	57
Oil production building in Paris basin	[illegible]	[illegible]
Foreign investors hike flow of capital to U.S. operations	[illegible]	[illegible]
Industry awaits incentives, acreage in Malaysia	[illegible]	48
Corpoven hails new oil area near Cano Limon	[illegible]	[illegible]
PATEL, I. D. (Agder Distriktshogskole); and GOKSEM, P. G. (Oil Industry Services A.S)		
Program gives design data for multiple [illegible] system to avoid [illegible]	[illegible]	[illegible]
PATHE, DAVID C. (Autodynamics Inc.)		
MICROCOMPUTER REPORT: [illegible] up and operations	[illegible]	[illegible]
PATTINSON, RONALD, BYRAMJEE, RUSTUM JEAN, and BOURDAIRE, JEAN MARIE (Total)		
Reserve assessment under [illegible]	[illegible]	[illegible]
PEACOCK, K. L. (Amoco Production Co.)		
Design of discrete bandpass filters for [illegible]	[illegible]	[illegible]
PEECK, A., and KOCH, F. O. (Hoesch Rohr AG); and MAXEY, W. A. (Battelle Memorial Institute); and JUNKER, G., and VOGT, G. H. (Mannesmann Forschungsinstitut); and PETERS, P. A. (Mannesmannrohren-Werke AG); and KUGLER, J., and SEIFERT, K. (Stahlwerke Peine-Salzgitter AG)		
Transition temperature tests show fracture behavior	4-22	75
PEES, SAMUEL T. (Consulting Geologist); and DELANEY, PATRICK J. V. (Geo-Informacoes Ltda.)		
Oil, gas potential of Brazil's Pelotas basin	2-18	117
PELHAM, ROGER O., and MORIARTY, RICHARD D. (Profimatics Inc.)		
REFINING TECHNOLOGY REPORT: Surveys show energy reduction still possible	5-27	65
PENDLETON, LARRY E. (Bechtel Investments); and RAMESH, A. BEHROOZ (Scientific Software-Intercomp)		
Bechtel develops innovative method for horizontal drilling	5-27	95
PETERS, D. L., and MALEC, D. R. (Nalco Chemical Co.)		
ETHYLENE REPORT: Hydrocarbon leak detector keeps ethylene plant on stream	9-2	53
PETERS, P. A. (Mannesmannrohren-Werke AG); and VOGT, G. H., and JUNKER, G. (Mannesmann Forschungsinstitut); and PEECK, A., and KOCH, F. O. (Hoesch Rohr AG); and MAXEY, W. A. (Battelle Memorial Institute); and KUGLER, J., and SEIFERT, K. (Stahlwerke Peine-Salzgitter AG)		
Transition temperature tests show fracture behavior	4-22	75
PETERSON, R. A., and HESJE, R. C. (Nova, an Alberta Corporation)		
Mechanical dry seal cuts pipeline compressor maintenance costs, downtime	3-18	150
PETTY, TERRY D. (Ocean Drilling & Exploration Co.)		
OFFSHORE REPORT: Odeco upgrades stability requirements for new Odyssey class semis	5-6	106
PETZET, G. ALAN (Journal Staff)		
Gas problems linger	1-7	39
How to train a scout—G. Alan Petzet	2-11	21
Kansas Hugoton infill program urged	2-25	53
Strip charts fine tune gas volume measurement	2-25	66
EXPLORATION/DEVELOPMENT USA: Midcontinent action tips toward development	3-11	94
Kendavis firms seek Chapter 11 protection	3-25	62
Phillips-Shell team gauges biggest oil flow in S. China Sea	4-22	48
Gas cycling to boost Hatter's Pond recovery	4-29	56
On mature oil provinces	7-22	37
Hugoton dispute ends; deep exploration set	7-22	58
U.S. superdeep core holes proposed	8-26	48
Construction advances on U.S. west-east line	9-16	80
Declining natural gas prices take toll of operations in Anadarko basin	10-21	25
Multilevel regulation	11-4	37
API REPORT: Phillips keeps eye on balance sheet in broad restructuring	11-18	100
Relief well drilling for blowout in North Texas	12-9	22
PETZET, G. ALAN, and DRAKE, ELIZABETH (Journal Staff)		
Reduced prices spark purchases of oil and gas reserves in U.S.	10-14	43
PETZET, G. ALAN, and OBEL, MICHAEL (Journal Staff)		
U.S. ammonia industry sees end to 5 year downturn	2-11	25
Kansas Hugoton infill program urged	2-25	53
PFENNING, DWIGHT (Energy Analysts Inc.); and EVANS, DAVID (National Bureau of Standards)		
Water sprays suppress gas well blowout fires	4-29	80
PHILPOT, P. A., and CRAYSTON, GEORGE W. (Shell U.K. Ltd.)		
Three gathering networks comprise northern North Sea gas system	8-12	84
PIASECKYJ, PETER J. (Duxbury Offshore Inc.); and PAGEZY, MICHEL (BSFE); and LOIRE, RENE (Tramco S.A.); and ARNAUD, JEAN (NAT)		
OFFSHORE REPORT: Simplified production-mooring system developed	5-6	136
PICK, A. R., and SMITH, J. D. (Interprovincial Pipe Line (NW) Ltd.)		
ANNUAL PIPELINE REPORT: Pipeline in Canada's far north in service	8-19	[illegible]
PIERSON, J. L., and WILCOX, K. D. (Panhandle Eastern Pipe Line Co.)		
Compressor station [illegible]	[illegible]	[illegible]
Compressor station [illegible] Computer [illegible]	[illegible]	[illegible]
PIERUCCI, S., DENTE, M., and RANZI, E. (Politecnico); and BARENDREGT, S., and CRONIN, P. (Pyrotec)		
ETHYLENE REPORT: [illegible]	[illegible]	[illegible]

	Date	Page
PISTORIUS, J. T. (American Cyanamid Co.)		
Analysis improves catalytic reformer troubleshooting	6-10	146
PITTMAN, JIM (Western Oceanic Inc.)		
DEEPWATER TECHNOLOGY REPORT: Computer speeds offshore well planning, rig scheduling	12-2	84
PURSER, JAMES, and JOHNSON, BERT E. (Southern Union Co.)		
Financial capital value criteria examined	9-9	158

Q

	Date	Page
QUEME, J.P., SIBRA, P., SOBEL, R. TH., VLEMMINGS, J. M. L. M., WALLER, G. J., CONRARD, M. C., CREMER, G., KOENIG, J. W. J., and OPITZ, H. M. (Concawe)		
Major study reveals EEC gas oil desulfurization costs	3-21	55
QUILLET, R. (Shell Recherche S.A.); and LEWIS, C. P. G. (Shell Research B.V.); and SCHREUDER, T. (Shell Curacao N.V.)		
Resid fuel-oil stability, cleanliness test improved	4-8	73
QUIN, RENE (Total Marine Norsk); and WIET, PAUL (Total Oil Marine); and BELLAMY, GILLES, and JOUANNEAU, JEAN-FRANCOIS (Comex Services)		
Pipeline repair technique cuts downtime	2-11	101

R

	Date	Page
RAGSDALE, RALPH (Stearns Catalytic Corp.); and HECK, W. E. (Tenneco Oil Processing & Marketing Co.)		
Tenneco revamps Chalmette refinery	1-14	79
RAJARAM, S. (Bharat Heavy Electricals Ltd.)		
Charts for velocity, quantity give quick stack gas flow	5-20	59
RAMESH, A. BEHROOZ (Scientific Software-Intercomp); and PENDLETON, LARRY E. (Bechtel Investments)		
Bechtel develops innovative method for horizontal drilling	5-27	91
RAMMAH, N. A. (Abu Dhabi Gas Industries Ltd.)		
Emergency shutdown pressure surge predictions limit LPG loading	11-25	87
RANZI, E., DENTE, M., and PIERUCCI, S. (Politecnico); and BARENDREGT, S., and CRONIN, P. (Pyrotec)		
ETHYLENE REPORT: Coking simulation aids on-stream time	9-2	69
RATERMAN, M. F. (Gulf Oil Products Co.)		
FCC catalyst flow-problem predictions	1-7	87
REEDER, M. L., and SCOTCHMAN, I. C. (Gaffney, Cline & Associates)		
Hydrocarbon generation—central and northern North Sea	3-25	137
REINERS, BOB, and BRADFORD, BEN (Dowell Schlumberger)		
ANNUAL PRODUCTION ISSUE: Analysis gives successful cement squeeze	4-1	73
REITSEMA, ROBERT H. (Consultant)		
Mud log finds erratic variation in gas composition from surface to reservoir	11-4	81
REITSEMA, ROBERT H. (Consultant); and LINDBERG, F. A. (Analex); and KALTENBACK, A. J. (Marathon Oil Co.)		
Quantitative mud-logging system tracks upward gas migration from the pay zone	11-18	116
RICKS, RICHARD L. (Exxon Co. U.S.A.)		
Acquisition of information: economic considerations	9-30	68
RIEB, S. L., MUHAIYUDDIN, MOHD YUSOF, and BRAMI, J. B. (Esso Production Malaysia Inc.)		
History and geology of Malaysia's [illegible] field	1-28	127
RINGHISEN, JOHN A., GARDNER, GEORGE R., and SANDY, JOE (Halliburton Services)		
Completion strategy [illegible]	[illegible]	143
RIVA, JOSEPH P. JR. (Congressional Research Service, Library of Congress)		
Domestic crude oil [illegible] capability	[illegible]	159
RIZZI, KENNETH W., SPILIOTIS, NICHOLAS J., and BLURTON, KEITH F. (Kollmorgen Corp.)		
[illegible]	[illegible]	[illegible]
ROBINSON, EDWARD (Consultant); and DALY, THOMAS E. (REMI Inc.); and DESPRETZ, JEAN-MARIE (Petrofina)		
Saba Bank petroleum geology, NE Caribbean	11-4	112
ROBINSON, GARY C. (Trans-Northern Pipelines Inc.)		
Canadian operator details internal inspection program	6-3	55
ROCHE, J. R. (Hydril Co.); and HALL, J. E. (Amoco Production Co.)		
OFFSHORE REPORT: Diverter for deepwater drilling risers permits kick control	5-6	116
ROGERS, LEO A. (Gas Research Institute); and TOMSON, MASON B., and MATTY, JANE M. (Rice University); and DURRETT, LARRY R. (W. K. Technology Inc.)		
ANNUAL PRODUCTION ISSUE: Saturation index predicts brine's scale-forming tendency	4-1	97
ROGERS, T. F., and SCHEIRMAN, W. L. (Pritchard Corp.)		
How to calculate sulfur storage-tank heat loss	1-14	96
ROOT, C. R., TILDEN, G. H., and RUGGIERO, M. L. (Amoco Production Co.)		
Waste-heat recovery saves fuel for Amoco	5-27	108
ROSENBLUM, ERIC, MOUCHE, WENDY G., and MATSON, JACK V. (University of Houston)		
Sidestream softening system cuts petrochem plant's effluent	[illegible]	76
ROSS, ROBERT R. (United Centrifugal Pumps); and FABECK, PIERRE H. (ACEC Belgium)		
Flexible inducer pumps can have wide operating range	8-5	96
ROWLAND, DAVID A. (University of Texas Permian Basin); and LIN, CHUNG (Oasis Oil Co.)		
Hyperbolic decline—2: New linear method gives constants of hyperbolic decline	1-14	86
Hyperbolic decline: Conclusion: Computer model solution proposed	1-21	77
ROY, ROBERT W., and WOLFF, ROGER G. (Cities Service Oil & Gas Corp.)		
Meeteetse field sparks search for more production in Wyoming's Bighorn basin	4-8	118
RUGGIERO, M. L., ROOT, C. R., and TILDEN, G. H. (Amoco Production Co.)		
Waste-heat recovery saves fuel for Amoco	5-27	108
RULE, D. D. (Esso Exploration & Production); and DENTON, ROBERT D. (Exxon Production Research Co.)		
Two combined cryogenic processes cut lean natural gas processing cost	8-19	125
RUTLEDGE, ANNE K., and LORENZ, JOHN C. (Sandia National Laboratories)		
Facies relationships, reservoir potential of Ohio Creek interval across the Piceance Creek basin	[illegible]	91
RYAN, BERNARD F., CASE, JAMES L., and JOHNSON, JOHN E. (Stearns Catalytic Corp.)		
CO_2-rich mixtures—1: CO_2 streams pose new design considerations	5-6	175
CO_2-rich mixtures—2: Water in high-CO_2 stream complicates design factors	5-13	103
RYAN, J. M., and SCHAFFERT, F. W. (Koch Process Systems Inc.)		
Ryan Holmes technology aids EOR projects	[illegible]	133

S

	Date	Page
SAFTI, MOHSEN VAFAIE, and MADDOX, R. N. (Oklahoma State University)		
Slip velocity added to two-phase pipeline calculations	6-17	94
SALEEM, MOHAMMAD, BUKHARI, AHMED, HASAN, MISBAH, and ALI, MOHAMMAD FARHAT (University of Petroleum and Minerals)		
Arabian crude oil residues evaluated	[illegible]	71
SAMHOURI, F. A., and AL-CHALABI, A. M. (Abu Dhabi Co. for Onshore Oil Operations)		
[illegible]	[illegible]	73
[illegible]	[illegible]	91
SANDERS, J. I., McBEATH, R. G., GILBERT, G. M., and EINARSSON, T. D. (Geophysical Service Inc.)		
[illegible]	[illegible]	44

	Date	Page
SANDY, JOE, GARDNER, GEORGE R., and RINGHISEN, JOHN A. (Halliburton Services)		
Completion strategy includes clay and precipitate control	5-6	193
SARDAR, H., and SIVASUBRAMANIAN, M. S. (Clarkson University); and WEILAND, RALPH H. (Taylor, Weiland & Associates Inc.)		
Simulation mirrors commercial amine units	10-7	133
SASSEN, ROGER (Louisiana State University)		
Basic geochemical strategies for hydrocarbon exploration	12-16	128
SAUNDERS, DONALD F., and TERRY, STEPHEN A. (Petrominex Inc.)		
Onshore exploration using the new geochemistry and geomorphology	9-16	126
SAUNDERS, DONNA, and CARLIN, FRANK (Baker Tubular Services)		
Tool-joint thread redesign cuts stress, increases fatigue life	7-22	75
SAVIDGE, J. L., HILL, M. J., and ELLINGTON, REX T. (University of Oklahoma)		
On-line compressibility factors can improve metering by minimizing measurement error	9-2	70
SAYLORS, SAMMIE E. (Dowell Schlumberger)		
CO_2: Properties and handling with safety	9-23	128
SCHAFFERT, F. W., and RYAN, J. M. (Koch Process Systems Inc.)		
Ryan Holmes technology lands EOR projects	1-28	133
SCHALLER, HANNFRIED, DAUZACKER, MODESTO VICTOR, CASTRO, AUGUSTO CANELLAS M. JR., and de SOUZA, MURILO MARROQUIM (Petrobras)		
Geology of Brazil's Atlantic margin basins	3-4	142
SCHEIRMAN, W. L., and ROGERS, T. F. (Pritchard Corp.)		
How to calculate sulfur storage-tank heat loss	1-14	96
SCHENDEL, RON, and SEYMOUR, JAMES (Fluor Engineers Inc.)		
Take care in picking membranes to combine with other processes for CO_2 removal	2-18	84
SCHICHO, C. M., WATSON, E. A., CLEM, K. R., and HARTLEY, D. (Exxon Research & Engineering Co.)		
System for degassing liquid sulfur can reduce total hydrogen sulfide to acceptable levels	12-9	56
SCHIEMENZ, A. M. (Canyon Lake, Tex.)		
Comment: Questions facing the independent operator	3-4	146
SCHMIDT, CHRISTOPHER (Western Michigan University); and LOPEZ, DAVID A. (North American Resources Co. Inc.)		
ANNUAL GEOPHYSICAL REPORT: Seismic profile across the leading edge of the fold and thrust belt of SW Montana	10-7	71
SCHMIDT, R. J., WEISZMANN, J. A., and JOHNSON, J. A. (UOP Inc.)		
REFINING TECHNOLOGY REPORT: Catalysts—key to low-cost isomerization	5-27	80
SCHREUDER, T. (Shell Curacao N.V.); and QUILLET, R. (Shell Recherche S.A.); and LEWIS, C. P. G. (Shell Research B.V.)		
Resid fuel-oil stability, cleanliness test improved	4-8	73
SCOTCHMAN, I. C., and REEDER, M. L. (Gaffney, Cline & Associates)		
Hydrocarbon generation—central and northern North Sea	3-25	137
SCOTT, ALEXANDER B. (Hammel Dahl + Jamesbury Controls Co.)		
CONTROL VALVE REPORT: Pneumatic valve actuator designs detailed	12-16	82
SCOTT, LARRY (BruningCAD)		
Calculator program gives pressure-vessel characteristics	2-4	60
SEIDL, J. M. (HNG Interstate Pipeline Co.)		
Comment: Further jolting changes await U.S. [illegible] pipeline companies	5-27	43
SEIFERT, K., and KUGLER, J. (Stahlwerke Peine-Sa[illegible]gitter AG); and PETERS, P. A. (Mannesmanrohren-Werke AG); and VOGT, G. H., and JUNKER, G. (Mannesmann Forschungsinstitut); and PEECK, A., and KOCH, F. O. (Hoesch Rohr AG); and MAXEY, W. A. (Battelle Memorial Institute)		
Transition temperature tests show fracture behavior	4-22	75
SEYMOUR, JAMES, and SCHENDEL, RON (Fluor Engineers Inc.)		
Take care in picking membranes to combine with other processes for CO_2 removal	2-18	84
SHAFFER, JEREMY (Bailey Controls)		
Microprocessor saves hp by improving compressor's surge control	12-23	42
SHAH, S. [illegible] A., and DENHAM, G. M. (Alpha Nuclear Co.); and CARD, J. W., and BELL, K. (Carleton University)		
Radon decay product measurements in radiometric uranium exploration: implications for petroleum exploration	6-24	114
SHAH, SUBHASH N., LEE, YUNG N., and JENSEN, DAVID G. (Halliburton Services)		
Frac treatment quality improved with field rheology unit	2-4	47
SHANNON, ERNEST, and JACKSON, LAWRENCE (British Gas Corp.); and ADEY, G. A. (British Pipeline Authority)		
British Gas has seamless pipe inspection program	9-9	147
SHARK, GREGORY, and JONES, DAVID E. (American Bureau of Shipping)		
OFFSHORE CONSTRUCTION REPORT: Classification group looks at floating production storage and offloading systems	11-11	60
SHAUGHNESSY, JOHN, JACKSON, CURTIS W., and WARREN, RONALD D. (Amoco Production Co.)		
DEEPWATER TECHNOLOGY REPORT: Well-control technique removes trapped gas from a subsea BOP	12-2	55
SHEFFIELD, J. S., and SITZMAN, J. J. (Exxon Co. U.S.A.)		
Air-drilling practices in the Midcontinent and Rocky Mountain areas can yield big savings	9-9	133
SIBRA, P., SOBEL, R. TH., VLEMMINGS, J. M. L. M., WALLER, G. J., CONRARD, M. C., CREMER, G., KOENING, J. W. J., OPITZ, H. M., and QUEME, J. P. (Concawe)		
Major study reveals EEC gas oil desulfurization costs	1-21	55
SIGALOVE, JOEL J. (InterOcean Industries Inc.)		
Geochemical identification of resource potential	3-18	164
SIGMUND, P. W., and KROOP, L. (Union Carbide Corp.); and TAGGART, G. W. (Ford, Bacon & Davis Inc.)		
Tail-gas treating system proves out in field test on operating Claus plant	6-3	64
SIMMONS, MATTHEW R. (Simmons & Co. International)		
How the contract drilling, service industries should plan to restructure	11-11	95
SIMONSON, M. J., and TURNER, W. J. (CSIRO)		
Compressor station transient flow modeled	5-20	79
SIMS, GORDON V. (Toscogen Inc.)		
Refinery cogeneration—1: Cogeneration plant margins predicted by performance models	12-16	105
Refinery cogeneration—conclusion: Power-purchase pacts key to plant margins	12-23	44
SITZMAN, J. J., and SHEFFIELD, J. S. (Exxon Co. U.S.A.)		
Air-drilling practices in the Midcontinent and Rocky Mountain areas can yield big savings	9-9	133
SIVALLS, C. RICHARD (Sivalls Inc.)		
Hydrogen sulfide service dictates special equipment design above requirements	7-8	56
SIVASUBRAMANIAN, M. S., and SARDAR, H. (Clarkson University); and WEILAND, RALPH H. (Taylor, Weiland & Associates Inc.)		
Simulation mirrors commercial amine units	10-7	133
SKARET, WARREN M., and COWARD, ROBERT S. (Canterra Energy Ltd.)		
Sulfur recovery hiked in Claus Sulfreen units at Ram River	4-8	86
SMALLING, D. A. (Elf Aquitaine Petroleum)		
Mud strategy slows sensitive shale sloughing	6-10	152
SMITH, GLENDA E., and BECK, ROBERT J. (Journal Staff)		
Restructuring helps take slice out of OGJ group earnings	5-20	25
Profits slide for OGJ group of firms	6-10	72
SMITH, J. D., and PICK, A. R. (Interprovincial Pipe Line (NW) Ltd.)		
ANNUAL PIPELINE REPORT: Pipeline in Canada's far north in service	8-19	71
SMITH, L. DOUGLAS (Purvin & Gertz Inc.)		
Lead-phasedown problems not restricted to refiners	6-24	95
SMITH, WILLIAM T. (Champlin Petroleum Co.)		
Comment: Hard times obscure long-term viability of petroleum industry	10-14	68
SMITHWICK, PAUL E. (Chevron U.S.A.); and DIEHL, GARY E. (Union Carbide Industrial Services Co.)		
N_2 sweep speeds reformer start-up after regeneration	11-25	104

	Date	Page
SNYDER, DAN L. (Borg-Warner)		
ANNUAL PRODUCTION ISSUE: Prudhoe challenges new choke-valve design	4-1	92
SOBEL, R. TH., VLEMMINGS, J. M. L. M., WALLER, G. J., CONRARD, M. C., CREMER, G., KOENIG, J. W. J., OPITZ, H. M., QUEME, J. P., and SIBRA, P. (Concawe)		
Major study reveals EEC gas oil desulfurization costs	1-21	55
SPARLIN, DERRY D., and HAGEN, RAYMOND W. JR. (International Completion Consultants Inc.)		
Sand control—1: Gravel packs require planning	8-5	87
Sand control—conclusion: Prevention of formation damage critical	8-12	92
SPILIOTIS, NICHOLAS J., RIZZI, KENNETH W., and BLURTON, KEITH F. (Kollmorgen Corp.)		
Galling-resistant zinc silicon phosphase coating protects thread connections in hostile service	7-15	136
SPIVEY, JOHN C., and IVEY, R. C. (E-Z Serve Softsearch Inc.); and WYMAN, RICHARD C. (Arthur Andersen & Co.); and HAYES, LINDA (Petroware Systems Inc.)		
Computer-aided petroleum engineering: a necessity for the competitive edge	5-27	112
STANDLEY, BOB, and KILENYI, TOM (Merlin Profilers Ltd.)		
ANNUAL GEOPHYSICAL REPORT: Petroleum prospects in the northwest seaboard of Scotland	10-7	100
STANNARD, JAMES H. JR. (Stannard & Co. Engineers)		
Routine for computer or calculator solves gas-flow problems	4-15	62
STARKS, LAURA (Diamond Shamrock Exploration Co.)		
Economic performance of oil projects evaluated by modified IRR	4-22	71
STARTZMAN, R. A., and WU, C. H. (Texas A&M University); and LINGE, F. (Shell International)		
Numerical simulator looks at cold-water injection and skin factor in damage assessment	2-18	81
STATHAM, WILLIAM H., MacDONALD, ROBERT C., CAMPBELL, JAMES E., and PAHWA, SURESH B. (Intera Technologies Inc.)		
MICROCOMPUTER REPORT: Microcomputers aid investment decisions	2-11	63
STEEG, HELGA (International Energy Agency)		
Comment: Gas role in Europe tied to competitive pricing	10-7	48
STEFFY, DAVID A., TURNER, RONALD F., MARTIN, GARY C., and FLETT, TABE O. (U.S. Geological Survey)		
Evolution and petroleum geology of the Navarin basin, Bering Sea, Alaska	8-5	116
STEIN, N. (SANS Co.)		
Resistivity and density logs key to fluid pressure estimates	4-8	81
Unique routine estimates velocity ratio values	6-3	76
Strength of cementation is estimated from well logs	7-15	132
STEINER, TOM (McGill Inc.); and THOMPSON, JOHN W. (Phillips Petroleum Co.)		
Valuable hydrocarbons recovered by fuel conditioning	3-11	130
STEPHENS, DENNY R., and McCONNELL, DONALD P. (Battelle Petroleum Technology Center)		
Riser design codes—1: Offshore pipeline design codes compared for loads, stress limits	7-15	128
Riser design codes—conclusion: Pipeline design codes compared graphically	7-29	139
STEPHENSON, STAN (Halliburton Services)		
New system improves liquid CO_2 metering accuracy	2-25	94
STEWART, W. D. (Geological Survey of Papua New Guinea); and DURKEE, E. F. (Worldwide Exploration Consultants Inc.)		
Petroleum potential of the Papuan basin	4-1	151
STOUT, CHARLES A., and BLAIR, CHARLES M. JR. (Magna Corp.)		
Interfacial spreading agents increase waterflood production	5-20	55
STRINGFELLOW, BILL (Weatherford International)		
Tests find hammering, fluid cutting, erosion cause float shoe failures	1-21	66
STRIPLING, T. E., KHAN, A. U., and DILLON, K. (Brown & Root)		
Hydraulic analysis aids high-pressure system design	1-28	125
STRIPLING, TRAVIS E. (Brown & Root International Inc.)		
Knowledge of pipeline system key to software specification	12-16	110
SULTAN, NADER H. (Kuwait Petroleum International Ltd.)		
Comment: KPC: No threat from OPEC downstream move	7-15	57
SZATMARI, PETER, MILANI, EDSON, LANA, MARCOS, CONCEICAO, JOAO, and LOBO, ANTONIO (Petrobras Research Center)		
How South Atlantic rifting affects Brazilian oil reserves distribution	1-14	107
T		
TAGGART, G. W. (Ford, Bacon & Davis Inc.); and SIGMUND, P. W., and KROOP, L. (Union Carbide Corp.)		
Tail-gas sweetening system proves out in field test on operating Claus plant	6-3	64
TAMMAMI, BEN (Superior Hard-Surfacing Co. Inc.)		
Simplifying reboiler entrainment calculations	7-15	134
TANZIL, STEPHEN (Forest Hills, N.Y.)		
Distribution of world oil resources	6-3	86
Change seen key to Indonesian oil outlook	7-29	162
TASKER, K. G. (Hydrocarbon Research Inc.); and MURPHY, J. R., and JOHNSON, T. E. (Air Products & Chemicals Inc.)		
Combined cracking processes boost fuel yields from low-quality crudes and residua	7-1	50
TAYLOR, K. O. (Consultant)		
Transmitting drilling data rig to office	8-12	80
TERRY, STEPHEN A., and SAUNDERS, DONALD F. (Petrominex Inc.)		
Onshore exploration using the new geochemistry and geomorphology	9-16	126
THOMPSON, D. R., and DUNLAP, LARRY (NL Baroid)		
Computer system controls mud during kick kill	11-25	92
THOMPSON, JOHN W. (Phillips Petroleum Co.); and STEINER, TOM (McGill Inc.)		
Valuable hydrocarbons recovered by fuel conditioning	3-11	130
TILDEN, G. H., ROOT, C. R., and RUGGIERO, M. L. (Amoco Production Co.)		
Waste-heat recovery saves fuel for Amoco	5-27	108
TIMM, CAROLYN M., and HENDERSON, GERALD J. (ARCO Exploration Co.)		
Ordovician stratigraphic hydrocarbon entrapment potential of Appalachia	4-29	118
TIPPEE, BOB (Journal Staff)		
Exporting an industry	2-18	37
EXPLORATION DEVELOPMENT USA: Rocky Mountain drilling action slips from higher 1984 levels	3-11	88
Those @#%*!*&#! polls	5-20	21
More worn out rhetoric	7-8	13
A firm company, maybe?	9-9	55
API REPORT: Amoco's changes seen as assets repositioning, not restructuring	11-18	108
The Turtle Club	12-30	29
TOFANI, GLENN D. (Bing C. Yen Inc.); and YEN, BING C. (California State University)		
Soil stress assessment can prevent corrosion, reduce pipeline coating damage	8-26	63
TOMLINSON, T. R., and BANKS, R. (Costain Petrocarbon Ltd.)		
ANNUAL GAS PROCESSING REPORT: LPG extraction process cuts energy needs	7-15	81
TOMPKINS, B. G., and HOWELL, AVERY L. JR. (Brown & Root International)		
OFFSHORE CONSTRUCTION REPORT: Analysis picks best offshore cable fireproofing	11-11	65
TOMPKINS, BILL G. (NRG Systems Engineers); and CHRISTENSEN, MIKE L. (Gulf Oil E&P Co.)		
OFFSHORE REPORT: Offshore instrument/control systems evaluated	5-6	166
TOMSON, MASON B., and MATTY, JANE M. (Rice University); and ROGERS, LEO A. (Gas Research Institute); and DURRETT, LARRY R. (W. K. Technology Inc.)		
ANNUAL PRODUCTION ISSUE: Saturation index predicts brine's scale-forming tendency	4-1	97
TREHERNE, D. M., BULL, M., HARPER, P. G., and JARDINE, S. I. (Heriot-Watt University)		
Microcomputer applications for control of novel acoustic direction sensing tool	2-11	123

Date Page

TRUE, WARREN R. (Journal Staff)
Bricks and bouquets 8-19 37
OFFSHORE CONSTRUCTION REPORT: Uptick due for U.K. North Sea pipelines 11-11 55
The Highlands A9 11-25 21
PIPELINE ECONOMICS REPORT: U.S. pipeline mileage up a bit in 1984 11-25 55
DEEPWATER TECHNOLOGY REPORT: Industry group to study deepwater line connections 12-2 98

TRUE, WARREN R., and HAGAR, RICK (Journal Staff)
Pipeline construction to decline in non-Communist areas in 1985 1-21 25

TRUMAN, PETER (Solar Turbines Inc.)
Automated combined-cycle, energy-recovery system is successful in gas-processing plant 9-2 64

TSAI, TOM C. (TDS Associates)
Sizing a vertical separator by microcomputer 2-25 113
ANNUAL PETROCHEMICAL ISSUE: Yield correlations for AGO cracking are reliable 3-25 96
Packed-tower program has special features 9-2 77

TURNER, RONALD F., STEFFY, DAVID A., MARTIN, GARY C., and FLETT, TABE O. (U.S. Geological Survey)
Evolution and petroleum geology of the Navarin basin, Bering Sea, Alaska 8-5 116

TURNER, W. J., and SIMONSON, M. J. (CSIRO)
Compressor station transient flow modeled 5-20 79

TYLER, NOEL, GALLOWAY, W. E., GARRETT, C. M. JR., and EWING, T. E. (University of Texas)
Oil accumulation, production characteristics, targets for added recovery in Texas reservoirs—1 2-25 123
Oil accumulation, production characteristics, targets for added recovery in Texas reservoirs—2 3-4 133

U

UDEGBUNAM, E. O. (University of Port Harcourt)
Model improves PVT predictions 11-25 102

UPSON, LAWRENCE L., and ANDREASSON HANS U. (Katalistiks B.V.)
Four main FCC factors affect octane 8-5 91

V

VALKA, WILLIAM A. (FMC Corp.); and FOWLER, JOE R. (Stress Engineering Services Inc.)
DEEPWATER TECHNOLOGY REPORT: Loads forces considered for deepwater wellheads 12-2 72

VAN ALSTINE, DAVID R., and BLEAKLY, DOUGLAS C. (Z-Axis Exploration); and PACKER, DUANE R. (Consultant)
Core orientation—1: Controlling errors minimizes risk and cost in core orientation 12-2 103
Core orientation—conclusion: How to evaluate orientation data, quality control 12-9 46

van HOUTERT, FRANS W., and NAT, PIETER J. (Akzo Chemie Nederland); and ASIM, MEHMET Y., and DESAI, PANKAJ H. (Akzo Chemie America)
Mild hydrocracking of FCC feeds produces yield benefits in mid-distillates, gasoline 7-22 106

van LAAK, F. A. L. (DSM); and ORBONS, P. J. (ARG); and HOEKS, C. P. (Dutch Service of Legal Metrology); and KOOI, A., and BELLINGA, H. (N.V. Nederlandse Gasunie)
Piston prover used to calibrate gas meters 8-19 89

VanSCHAFTEN, GARY F., ADKERSON, RICHARD C., and HECKER, JAMES A. (Arthur Andersen & Co.)
INDEPENDENT OPERATIONS REPORT: Perspective the key to raising capital from institutions 10-28 101

VAROTSIS, NIKOS, WILLIAMS, JOHN MICHAEL, and GUIEZE, PAUL (Flopetrol-Johnston)
Equations determine locus of PVT curves 10-21 79

VENNIN, H. C. (Cristal Profor)
Diamond-bit technology pushes hydraulic, rotation limits 12-23 55

Date Page

VENUS, TOM, and DORSEY, DAVE (Mayco Wellchem)
Drilling cement with a polymer mud 4-1 128

VERLEGER, PHILIP K. JR. (Charles River Associates Inc.)
Comment: What lies behind those weak prices for petroleum products 2-25 59

VERM, RICHARD W., WADE, CHRIS J., and MATER, JAMES L. (Floating Point Systems)
ANNUAL GEOPHYSICAL REPORT: High-performance 3D migration of seismic data 10-7 92

VIELVOYE, ROGER (Journal Staff)
OPEC's Christmas 1-7 61
Markets reject OPEC price efforts 1-7 62
OPEC will tackle differentials again 1-14 37
West African scene 1-14 42
North Yemen operations 1-21 33
Europe's chill eases price pressures on OPEC 1-21 49
Iran's export program 1-28 70
Saudi petrochem buildup 2-4 33
Spitsbergen area exploration programs pick up 2-4 40
Barents hotspot 2-11 37
Sleipner repercussions 2-18 59
Offshore muscle 2-25 49
Discoveries spark industry interest in Norwegian Sea 3-4 41
Flags of convenience 3-4 54
BGC's balancing act 3-11 50
Future gloomy for refining industry in western Europe 3-18 41
A test for Petroscan 3-18 62
BNOC's demise 3-25 49
EEC's auto exhaust plan 4-1 49
Outlook for jack ups 4-8 51
Spill cleanups 4-15 42
No gas for Northern Ireland 4-22 52
European EOR 4-29 51
Offshore discontent 5-6 89
Privatizing BGC 5-13 65
Onshore accent in Spain 5-20 33
OPEC oil outlook 5-27 35
Probing the Barents 6-3 40
Tunnels to Troll? 6-10 53
British distinctions 6-10 75
OFFSHORE NORTHERN EUROPE REPORT: Oil production up, activity levels high off northern Europe 6-10 91
OFFSHORE NORTHERN EUROPE REPORT: Oil development boom heats up off U.K. 6-10 92
OFFSHORE NORTHERN EUROPE REPORT: U.K. focus on domestic natural gas promises more brisk offshore activity 6-10 96
OFFSHORE NORTHERN EUROPE REPORT: Norway eyes replacements for Sleipner gas project 6-10 104
OFFSHORE NORTHERN EUROPE REPORT: Dutch offshore crude and gas production post increases 6-10 116
OFFSHORE NORTHERN EUROPE REPORT: Technology, terms keys to small producer work 6-10 122
OFFSHORE NORTHERN EUROPE REPORT: Development cost control vital in marginal projects off U.K. 6-10 128
Projections up for total energy demand by IEA nations in 1990 6-17 57
Avoiding the 'bends' 6-17 69
U.K. royalty crude 6-24 38
U.K. offshore R&D 7-1 33
Quasco's assignment 7-8 29
OPEC and Platform C 7-15 49
OPEC fails to act on output, prices 7-15 54
Timing the Britoil sale 7-22 52
Mossmorran achievements 7-29 68
OPEC orders slight cut in price of heavy crude 7-29 73
BGC can't wait 8-5 43
Independents playing bigger role in U.K. N. Sea search 8-12 41
OPEC's falling rig count 8-12 58
Tanker surplus persists 8-19 67
Cleaning up the sea 8-26 41
Nigeria first 9-2 25
Saga's surprise in Benin 9-9 68
Flow of development projects slows off U.K. 9-16 65
A nod from Cnooc 9-16 78
Saudis' refiner netback contracts puch OPEC to brink of price war 9-23 41
Bullish on U.K. North Sea 9-23 59
Saxon, 'T' block bidding 9-30 29
Iran-Iraq war heats up 10-7 67
Selling Norwegian gas 10-14 50
OPEC fails to act on price, production 10-14 60
Oil price outlook 10-21 50
Yemen's bright prospects 10-28 49
BP investing for power base in Southeast Asia 11-4 52
Malaysia's privatization 11-4 59
N. Sea oil production headed for 3.7 million b/d high mark 11-11 25
Privatizing BGC 11-11 30

	Date	Page
IPAC: invest here	11-18	63
Energy Advocates	11-25	49
Norway's deep water	12-2	49
Business under fire	12-9	23
Spain's state oil firms merge, push oil, gas work	12-16	58
Fuel from waste	12-16	60
OPEC threat triggers crude price drop	12-16	61
Free market for gas?	12-23	25
Tunisian-Libyan boundary	12-30	57
VIELVOYE, ROGER, and OBEL, MICHAEL (Journal Staff)		
Big Singapore refining center faces sharp drop in crude runs	11-18	57
VLEMMINGS, J. M. L. M., WALLER, G. J., CONRARD, M. C., CREMER, G., KOENIG, J. W. J., OPITZ, H. M., QUEME, J. P., SIBRA, P., and SOBEL, R. TH. (Concawe)		
Major study reveals EEC gas oil desulfurization costs	1-21	55
VOGT, G. H., and JUNKER, G. (Mannesmann Forschungsinstitut); and PEECK, A., and KOCH, F. O. (Hoesch Rohr AG); and MAXEY, W. A. (Battelle Memorial Institute); and PETERS, P. A. (Mannesmannrohren-Werke AG); and KUGLER, J., and SEIFERT, K. (Stahlwerke Peine-Salzgitter AG)		
Transition temperature tests show fracture behavior	4-22	75
W		
WADE, CHRIS J., VERM, RICHARD W., and MATER, JAMES L. (Floating Point Systems)		
ANNUAL GEOPHYSICAL REPORT: High-performance 3D migration of seismic data	10-7	92
WAHLMEIER, MARK, and LAM, SIMON (Dowell Schlumberger)		
Mathematical algorithm aids analysis of "U-tubing" during slurry placement	1-7	80
WALL, T. A., and KIEFNER, JOHN F. (Battelle Columbus Laboratories)		
Pipeline lowering—1: Calculations help control stresses	10-14	128
Pipeline lowering—conclusion: Calculations for lowering method hold stress within fixed limits	10-21	70
WALLACE, CHARLES B. (Shell Oil Co.)		
Drying supercritical CO_2 demands care	6-24	98
WALLER, G. J., CONRARD, M. C., CREMER, G., KOENIG, J. W. J., OPITZ, H. M., QUEME, J. P., SIBRA, P., SOBEL, R. TH., and VLEMMINGS, J. M. L. M. (Concawe)		
Major study reveals EEC gas oil desulfurization costs	1-21	55
WARD, GREGG D. (Panhandle Eastern Pipeline Co.)		
Ultimate-strength design method ensures swaged tubing-connection integrity	5-6	196
WARREN, BRENT (Technifluids)		
Mercuric method determines drilling-fluid chlorides	1-28	130
WARREN, RONALD D., JACKSON, CURTIS W., and SHAUGHNESSY, JOHN M. (Amoco Production Co.)		
DEEPWATER TECHNOLOGY REPORT: Well-control technique removes trapped gas from a subsea BOP	12-2	55
WATANASIRI, S., and KUMAR, K. H. (University of Oklahoma); and BRULE, M. R. (Kerr-McGee Corp.)		
Characterization methods improve phase-behavior predictions	2-11	87
WATSON, E. A., SCHICHO, C. M., CLEM, K. R., and HARTLEY, D. (Exxon Research & Engineering Co.)		
System for degassing liquid sulfur can reduce total hydrogen sulfide to acceptable levels	12-9	56
WATSON, STEVEN K., and BERTAGNOLLI, RICHARD (Milchem Inc.)		
Technique determines particle-size distribution in oil muds	3-18	146
WAYLAND, J. R. JR. (Sandia National Laboratories); and LEIGHTON, ALAN J. (Leighton Consulting Services)		
Mapping technology: a key to EOR control	12-2	109
WEILAND, RALPH H. (Taylor, Weiland & Associates Inc.); and SARDAR, H., and SIVASUBRAMANIAN, M. S. (Clarkson University)		
Simulation mirrors commercial amine units	10-7	133
WEISZMANN, J. A., JOHNSON, J. A., and SCHMIDT, R. J. (UOP Inc.)		
REFINING TECHNOLOGY REPORT: Catalysts: key to low-cost isomerization	5-27	80
WENNEKERS, DR. J. HENRI N. (Consultant)		
CO_2 enhanced oil recovery in a new Montana oil province: Sweetgrass arch	7-15	147
WEST, JIM (Journal Staff)		
Beyond the gloom	3-11	37
Save get 6.	4-22	37
Talk about mileage!	9-30	13
What went wrong	10-28	35
INDEPENDENT OPERATIONS REPORT: Last year's economic recovery for U.S. independents fizzles in first half of '85	10-28	71
WETT, TED (Journal Staff)		
Saudi achievement	3-25	37
ANNUAL PETROCHEMICAL ISSUE: Saudi petrochem complexes make debut	3-25	71
ANNUAL PETROCHEMICAL ISSUE: Stop-and-go recovery tempers petrochemical construction	3-25	80
ANNUAL GAS PROCESSING REPORT: Numbers positive for 1984 gas processing	7-15	71
A new reality	9-2	13
ETHYLENE REPORT: New capacity forces ethylene producers to aim for lower cost, flexibility	9-2	39
ETHYLENE REPORT: Polymer demand could quickly soak up new olefin output	9-2	44
ETHYLENE REPORT: Balance ethylene product slate, cut costs	9-2	46
WHITMAN, STEPHEN K., and ANEROUSIS, JOHN P. (Physichem Technologies Inc.)		
Iron sponge: Still a top option for sour gas sweetening	2-18	71
WIET, PAUL (Total Oil Marine); and QUIN, RENE (Total Marine Norsk); and BELLAMY, GILLES, and JOUANNEAU, JEAN-FRANCOIS (Comex Services)		
Pipeline repair technique cuts downtime	2-11	101
WILCOX, K. D., and PIERSON, J. L. (Panhandle Eastern Pipe Line Co.)		
Compressor analysis—1: Computer system aids in compressor selection	6-24	105
Compressor analysis (conclusion): Computer sets station guidelines	7-1	56
WILHELM, STEVEN, LAMBERT, DAVID D., KOGER, DAVID G., and MORGAN, KEN M. (Texas Christian University)		
Recent advancements in the resolution of Landsat imagery for geologic mapping	12-23	66
WILKINSON, JEFFREY M. (Oil & Gas Micro Systems)		
User's needs dictate features of oil/gas micro systems	4-15	66
WILLIAMS, BOB (Journal Staff)		
The shellfish conspiracy	1-14	21
OFFSHORE SOUTHERN CALIFORNIA REPORT: Big finds spur push off California	1-14	55
OFFSHORE SOUTHERN CALIFORNIA REPORT: Access problems cool exploration off California	1-14	65
OFFSHORE SOUTHERN CALIFORNIA REPORT: Miocene Monterey remains major challenge	1-14	70
EXPLORATION/DEVELOPMENT USA: West Coast operators eye hard-to-extract oil reserves	3-11	74
California cogeneration on the rise	3-25	56
Point of view: Nahama: Megamergers mean opportunity for independents	4-1	161
Arauca's new anthem	4-15	19
Giant Cano Limon discovery thrusts Colombia to forefront	4-15	23
Colombia's open door sparks E&D	4-22	64
First wildcats scheduled in Navarin basin off Alaska	5-6	73
Unocal, Mesa end takeover scuffle	5-27	41
Binary geothermal plant prepares for start-up	6-24	33
Arctic crossroads	8-5	21
NORTH AMERICAN ARCTIC REPORT: Economics critical to Arctic developments	8-5	55
NORTH AMERICAN ARCTIC REPORT: Engineers trying new approach to Arctic construction, production, and transportation	8-5	76
NORTH AMERICAN ARCTIC REPORT: Alaskan exploration shifts to eastern Beaufort	8-5	80
NORTH AMERICAN ARCTIC REPORT: ARCO eyes production start at Lisburne during late 1986	8-5	84
Struggle develops over potential EOR gas market in California	8-26	25
Spray ice island technology advancing in Arctic	9-2	28
California priorities	9-16	53
U.S. geothermal retrenching from period of vigorous expansion	9-30	17
Big Kern County cogeneration plant starts up	10-14	55
EOR's historical strands	10-21	21
API REPORT: Chevron's restructuring spurring innovation	11-18	93
API REPORT: ARCO seeks streamlined look, backs away from wildcatting	11-18	116

	Date	Page
WILLIAMS, DEAN, and EIBER, ROBERT J. (Battelle Columbus Laboratories)		
Test measures ERW line pipe weld ductility	4-8	96
WILLIAMS, JOHN MICHAEL, GUIEZE, PAUL, and VAROTSIS, NIKOS (Flopetrol-Johnston)		
Equations determine locus of PVT curves	10-21	79
WILLIAMS, P. A., DISHROON, C. P., and KINGSTON, D. R. (Esso Exploration Inc.)		
A hydrocarbon exploration crustal classification	3-11	146
Global basin classification system	5-6	238
Hydrocarbon plays, global basin classification	5-6	265
WILSON, JOHN L. (Arthur Young & Co.)		
Natural-gas tax credit after control	2-18	87
WIZIG, HERBERT W. (Merichem Co.)		
Modular system cleans up FCC fuel gas	8-12	78
WOLFF, ROGER G., and ROY, ROBERT W. (Cities Service Oil & Gas Corp.)		
Meeteetse field sparks search for more production in Wyoming's Bighorn basin	4-8	118
WOLTERMANN, G. M., CORMIER, W. E., and MAGEE, J. S. (Katalistics Inc.)		
REFINING TECHNOLOGY REPORT. Octane catalysts contain special sieves	5-27	59
WOMACK, GENE (International Association of Geophysical Contractors)		
Comment: Political roadblocks pose threat to geophysical work	3-11	51
WONG, H. A. (Chevron Canada Resources Ltd.); and KOHLER, R. (Union Carbide Canada); and KOSSEIM, A. J., KUBEK, D. J., and McCULLOUGH, J. G. (Union Carbide Corp.)		
Corrosion-inhibition system passes severest test at Chevron's Princess MEA plant	11-11	100
WOOD, BRIAN (Permits West Inc.)		
Drilling deadline near for most pre-Flpma leases	7-1	75
WOOD, JOHN R. (Petroleum Refining Consultants)		
Coil-design visbreaker for HGO recovery has advantages	4-22	81
WOODS, THOMAS J. (Gas Research Institute)		
Resource depletion and Lower 48 oil and gas discovery rates	10-28	140
WOODWARD, LEE A. (University of New Mexico)		
Growth faults bounding Albuquerque basin may have created hydrocarbon traps	7-22	131
WRENCH, RICHARD E., YEN, LEWIS C., and KUO, CHIA MING (M. W. Kellogg Co.)		
FCCU regenerator temperature effects evaluated	9-16	87
WU, C. H., and STARTZMAN, R. A. (Texas A&M University); and LINGE, F. (Shell International)		
Numerical simulator looks at cold-water injection and skin factor in damage assessment	2-18	81
WYMAN, RICHARD C. (Arthur Andersen & Co.); and IVEY, R. C., and SPIVEY, JOHN C. (E-Z Serve Softsearch Inc.); and HAYES, LINDA (Petroware Systems Inc.)		
Computer-aided petroleum engineering—a necessity for the competitive edge	5-27	112
Y		
YANIK, STEPHEN J., DEMMEL, EDWARD J., HUMPHRIES, ADRIAN P., and CAMPAGNA, ROBERT J. (Harshaw/Filtrol Partnership)		
FCC catalysts containing shape-selective zeolites boost gasoline octane number and yield	5-13	108
YEN, BING C. (California State University); and TOFANI, GLENN D. (Bing C. Yen Inc.)		
Soil stress assessment can prevent corrosion, reduce pipeline coating damage	8-26	63
YEN, LEWIS C., WRENCH, RICHARD E., and KUO, CHIA MING (M. W. Kellogg Co.)		
FCCU regenerator temperature effects evaluated	9-16	87
YEPSON, G. L., CULBERSON, S. F., and BARTHOLOMEW, K. D. (The Pace Co.)		
ANNUAL REFINING ISSUE. Refiners mull no-lead options	3-18	108
Z		
ZDYBAK, JAN M. L., NEAL, JOHN A., and BANNERMAN, WYBURN G. (Georgia-Pacific Corp.)		
Lignosulfonate copolymer stabilizes lime muds	3-25	118